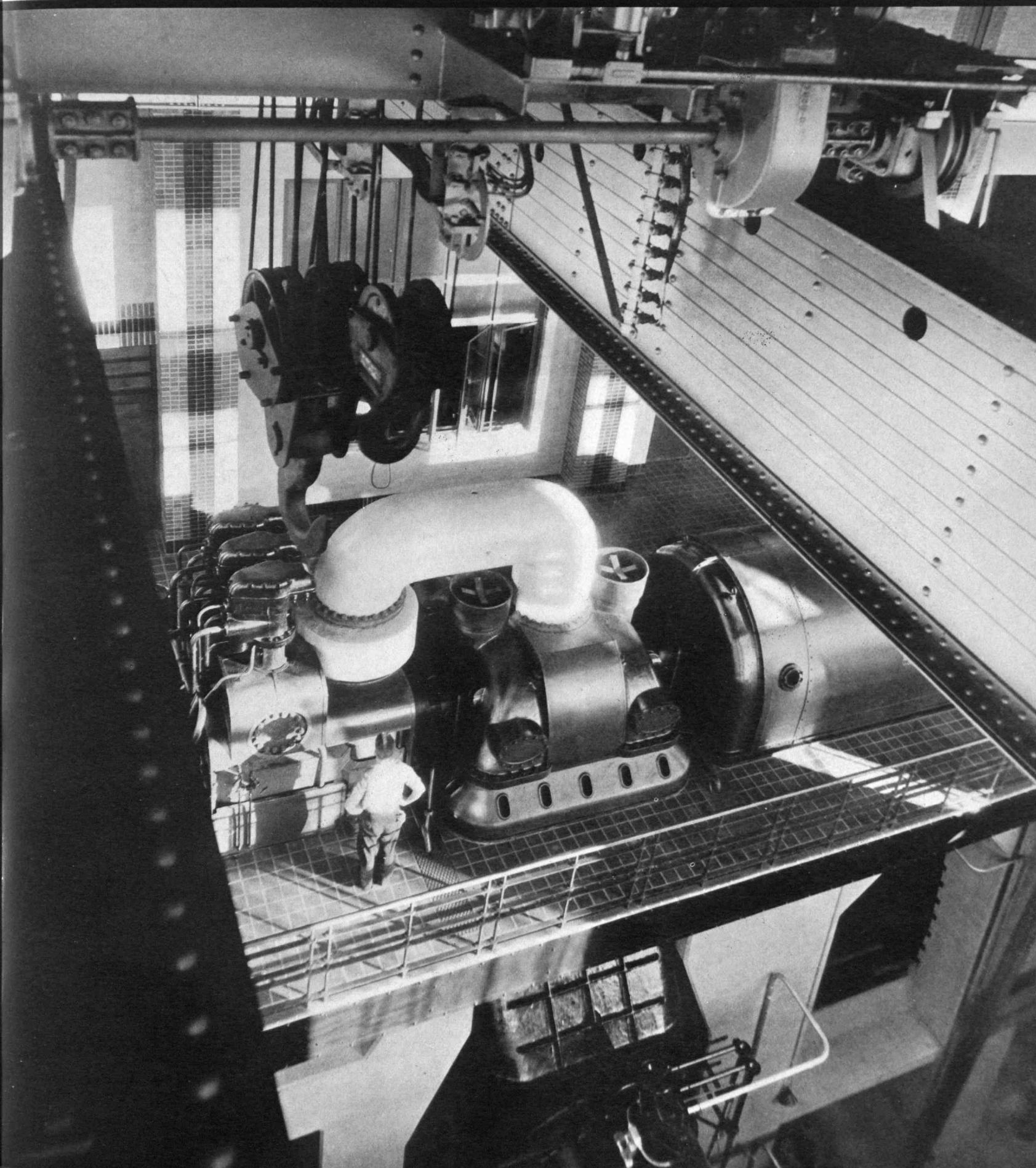


March 1933

TECHNOLOGY REVIEW



technology review

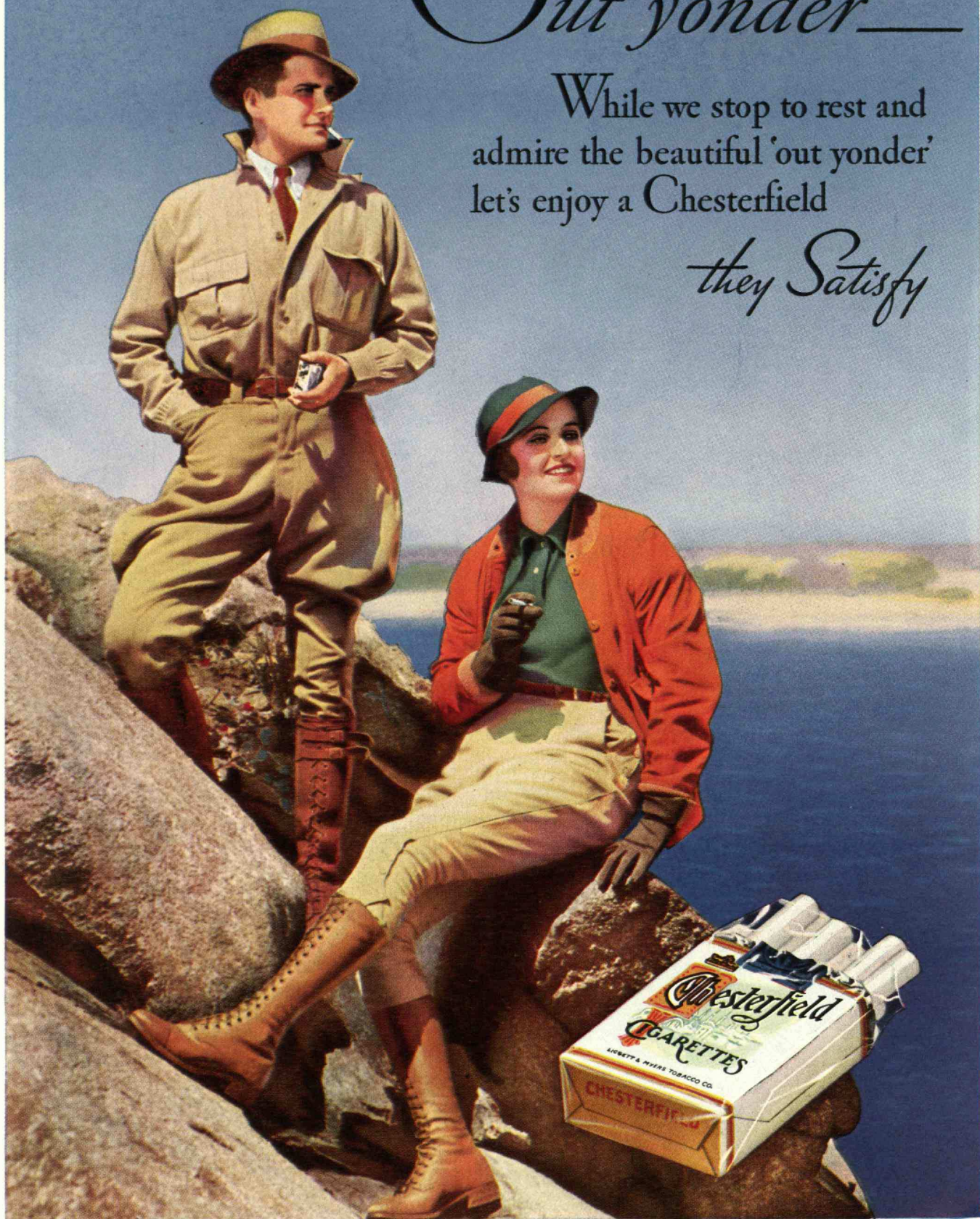
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Out yonder—

While we stop to rest and
admire the beautiful 'out yonder'
let's enjoy a Chesterfield

they Satisfy



THE TABULAR VIEW

AS A biologist and physiologist, Dr. WALTER B. CANNON is renowned the world over. What Renan said of Pasteur might appropriately be applied to him: "No one has walked so surely through the circles of elemental nature; . . . [his] scientific life is like unto a luminous tract in the great night of the Infinitesimally Small, in that last abyss where life is born." Those who would be more familiar with Dr. Cannon's ideas should not fail to read his recently published book, "The Wisdom of the Body." He first presented his paper on Biocracy at the Annual Dinner of the M.I.T. Alumni Association in February.

DR. DUGALD C. JACKSON is Head of the Department of Electrical Engineering at M.I.T. and an outstanding figure in American scientific and engineering circles. In 1919 he organized the firm of Jackson and Moreland, of which he was senior partner until his retirement from active consulting work in 1930. He has taken part in the design of such projects as the Conowingo hydroelectric plant, the electrification of the Cascade Division of the Great Northern Railroad and of the suburban division of the Delaware, Lackawanna and Western Railroad, and the appraisal of many public utility properties. His article on page 207 is drawn from a paper presented by him before the recent meeting of the American Association for the Advancement of Science. It should be added that Dr. Jackson's material was assembled before the Technocrats launched their short-lived publicity program. ¶ In speaking of the Technocrats, we cannot refrain from slaying the slain by paraphrasing a stanza of George Meredith's, written in the middle of the Nineteenth Century:

And now we have the Technocrat
With all his unchecked gabble
With doctrines like a brewer's vat
Fermenting for the rabble.

BEFORE the World War, JOHN J. ROWLANDS prospected in the silver country of Northern Ontario prior to the time the airplane came into use as an adjunct to mining. He is in a position, therefore, to realize how great have been the contributions of the airplane to economic exploration and to the servicing of mining territory. Mr. Rowlands is a Contributing Editor to The Review and Director of the News Service of M.I.T. ¶ Mrs. KATHARINE MAYNARD is Vail Librarian at M.I.T. ¶ Dr. ARTHUR B. LAMB, '02, is Professor of chemistry at Harvard University and at the present time is President of the American Chemical Society.

ON December 31, 1856, Thomas Huxley, writing in his journal, asked himself if the following were his aims in life: "To smite all humbugs, however big; to give a nobler tone to science; to set an example of abstinence from petty personal controversies and of toleration for everything but lying . . ." In thus questioning himself, did not Huxley set down an admirable editorial policy for a magazine devoted to science?



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The Cross of Gold



Mid-summer 1896 saw sweating delegates to the Democratic National Convention in Chicago fiercely split into two camps: Gold (currency based on gold only) and Silver (Bi-metalism, currency based on both silver and gold) The financial crisis of 1893 had forced the government to stop buying and minting silver. Thus money was growing scarce, particularly for Western and Southern farmers. They, burdened with mortgages and debts contracted during the post-Civil War boom when currency was plentiful, now demanded free and unlimited silver coinage with which to pay these debts. The Republicans weaseled, declared for a gold standard until international bi-metalism was possible. Eastern Democrats led by Senator Hill of New York also stood for gold In the stifling convention hall, the debate dragged on. As *TIME*, had it been published July 13, 1896, would have reported subsequent events:

. . . Last scheduled speaker was Nebraska's young onetime congressman, William Jennings Bryan, No. 1 Orator of the Silver Democrats. His sonorous voice easily filled the hall as he sketched the history of the currency conflict, then defiantly faced the Gold delegates:

"You tell us that we are about to disturb your business interests You have disturbed our business interests by your course The man who is employed . . . attorney in a country town . . . merchant . . . farmer . . . miners . . . are as much business men as the few financial magnates who, in a back

room, corner the money of the world. We speak for this broader class of business men (Cheers) Our petitions . . . scorned . . . We beg no longer. We petition no more. We defy them. (Loud applause) The holders of fixed investments have declared for the gold standard, but not . . . the masses. . . .

"There are two ideas of government: There are those who believe that if you . . . make the well-to-do prosperous, their prosperity will leak through on those below. The Democratic idea has been, however, that if you legislate to make the masses prosperous, their prosperity will find its way up through every class which rests upon them. (Cheers)

"You tell us that the great cities are in favor of the gold standard. We reply that the great cities rest upon our broad and fertile prairies Destroy our farms and the grass will grow in the streets of every city in the country. . . .

"Having behind us the producing masses of this nation and the world . . . we will answer their demand for a gold standard by saying to them: *You shall not press down upon the brow of labor this crown of thorns; you shall not crucify mankind upon a cross of gold.*"

A moment's silence, then a frenzied roar that announced the coming to glory of a new leader. Yelling, weeping, hundreds of delegates struggled to the platform. Eight huskies lifted Orator Bryan to their shoulders, and the parade began Later the Convention rejected the gold plank, adopted one demanding "free and unlimited coinage of both silver and gold at the present legal ratio of 16 to 1." That night a huge crowd gathered in front of Bryan's hotel, forced him to repeat his speech. . . . Next day another crowd rushed to the barber shop where No. 1 Orator Bryan was being shaved, to tell him that he was Democratic Candidate for U. S. President, to run on a strictly Bryan platform

Cultivated Americans, impatient with cheap sensationalism and windy bias, turn increasingly to publications edited in the historical spirit. These publications, fair-dealing, vigorously impartial, devote themselves to the public weal in the sense that they report what they see, serve no masters, fear no groups.

TIME

The Weekly Newsmagazine

G-E Campus News



TAMING LIGHTNING

A crackle, a deafening crash—and a gigantic streak of man-generated lightning leaped 30 feet. Thus, was 10,000,000 volts, the largest artificial flash ever produced by man discharged at the G-E high-voltage laboratory.

To produce this enormous voltage, a 50,000,000-kw. lightning generator imitates nature. Hundreds of small capacitors take the place of nature's clouds. They are charged by transformers. When the voltage is built up, the capacitors are discharged in series to produce 10,000,000 volts. Sounds simple, doesn't it? However, the power output of the generator—during the infinitesimal period of the flash—is nearly twice that of all the generating stations in the United States.

F. W. Peek, Jr., a Stanford grad of '05, was chiefly responsible for this achievement—incidentally, he is now the chief engineer of the G-E Pittsfield works. "Lightning tamer," his old classmates would probably call him. And rightly proud of him they should be, for in the field of transients and dielectric phenomena he is second to no one.

ATOM CHASER

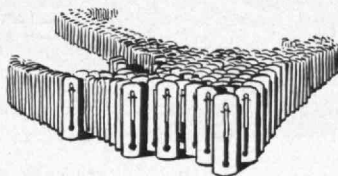
On December 10th last, a mild-mannered scientist stood in the Great Hall in Stockholm and received the Nobel award in chemistry for 1932. Then he went skiing with his wife and daughter, seemingly unmoved by being the second American chemist in 31 years to be so honored.

In 1909 Dr. Irving Langmuir, a '03 graduate of Columbia University,

came to Schenectady, to the G-E Research Laboratory, to ask questions about tungsten wire, its behavior in a vacuum. He stayed, just "looking around" and wondering why the bulbs of incandescent lamps blackened so easily. He found out, and thus developed the gas-filled lamp. It saves Americans a million dollars every night.

Then he wondered about atoms co-operating with electrons and produced the high-vacuum electronic tube, making possible radio broadcasting, which created an industry. Incidentally, he contributed a new type of welding—atomic-hydrogen.

They call him atom chaser, electron driver. The Swedish Academy of Science rewarded him—not for lamps, radio tubes, or welding methods, but for achievements in pure science. For just "wondering."



25 MILLION THERMOMETERS

You may have heard about our new power plant at Schenectady—the first of its kind ever built. In it there's a 20,000-kw. mercury-vapor turbine. The plant uses mercury vapor for power, the exhaust vapor producing superheated steam.

270,000 pounds of mercury will be needed for the boilers. That's enough for 25,000,000 thermometers. Perhaps you wonder why we don't use water. Well, the new process makes possible some thirty per cent more power from coal than heretofore. And we don't expect that those boilers will be refilled.

W. L. R. Emmet, an '81 graduate of the U. S. Naval Academy is the inventor of this mercury-vapor process. That isn't all he's done either. In his capacity as a consulting en-

gineer at G. E., he developed the steam turbine from a small beginning to a place of dominating importance, and he first applied electric power to ship propulsion.



FLAME WITHOUT SMOKE

Smoke and soot mean wasted energy. That's what our engineers thought, too. They rolled up their sleeves and began to work. For five years they studied electric control of oil combustion. And they developed progressive impact combustion; they broke a single drop of furnace oil into a hundred million parts.

In this process, oil and air collide under pressure, and each drop of oil breaks up into millions of particles. Application of heat further breaks down the oil into gaseous hydrocarbons; and when the latter encounters air, the entire energy of the fuel is converted into hot flame without loss of carbon in smoke.

This is just one of the features of the radically different G-E oil furnace—another G-E achievement. And such men as E. D. Harrington, a '16 grad of Beloit College, helped to chuck tradition to the winds. He was closely associated with the entire development of the oil furnace. He's now Engineer of the new Air Conditioning Department.



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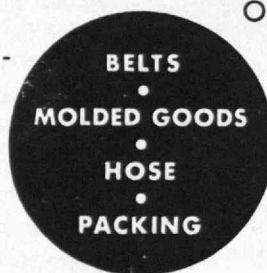
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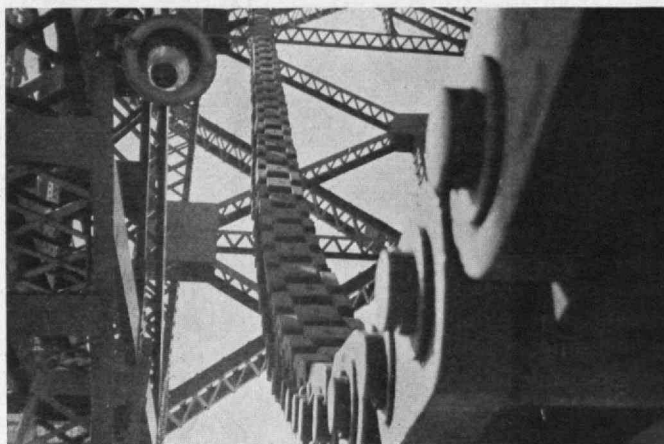
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THE TECHNOLOGY REVIEW

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Edited at the Massachusetts Institute of Technology

VOLUME 35

NUMBER 6

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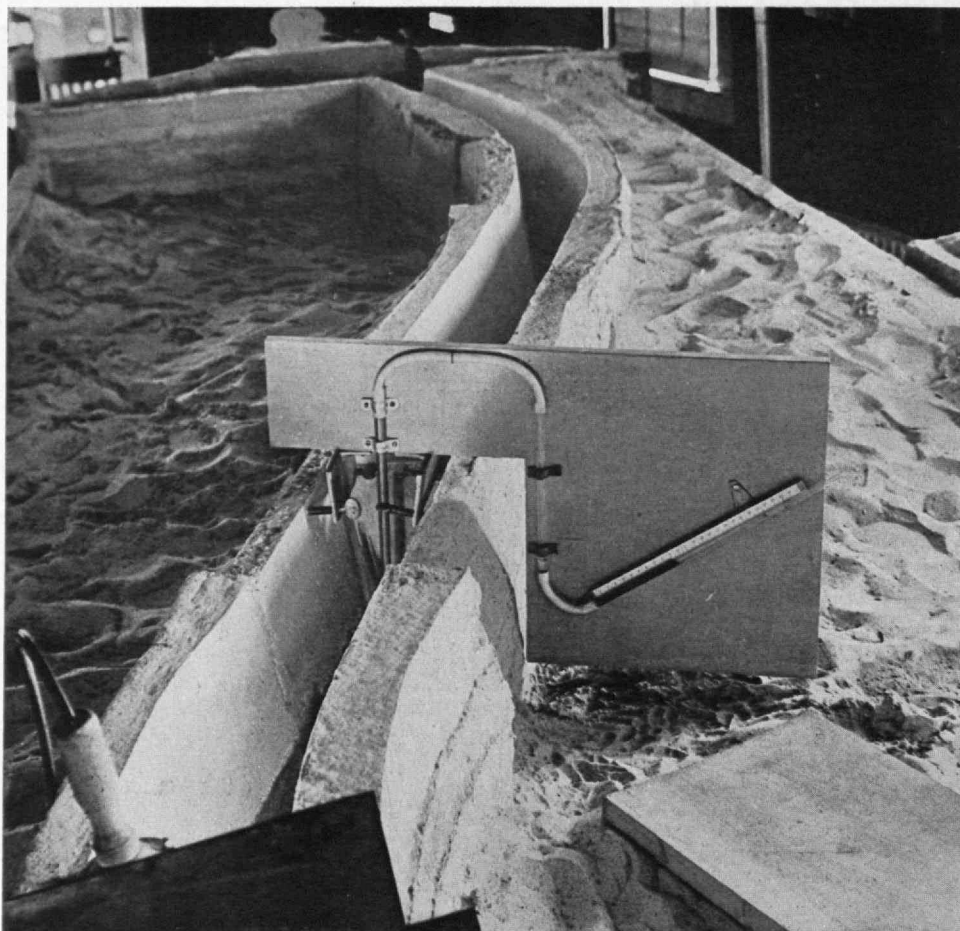
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the sea is still falling in Cape Cod Bay, and the tide in Buzzards Bay begins to ebb several hours before high water at the opposite end of the canal.

Under extraordinary conditions of flood tide driven by high winds, maximum differences in level of nine feet between the bays may occur.

LEFT: A section of the model of the Cape Cod Canal in the River Hydraulic Laboratory of M. I. T., where studies of the tidal currents in this famous Massachusetts waterway are now in progress. The instrument shown in the canal channel, records changes in water level accompanying the rise and fall of the tides of the Atlantic, which are faithfully reproduced in miniature.

BELOW: John B. Drisko, '27, of the Hydraulic Laboratory Research Staff, turning a crank which, by operating a hinged board, raises or lowers the level of the water to simulate tide changes.

Model of Cape Cod Canal

The tides of the Atlantic Ocean have been brought into a laboratory of M. I. T., where they now ebb and flow at the will of engineers for study of their behavior in a model of the Cape Cod Canal. The object of this research, now in progress in the River Hydraulic Laboratory of the Institute, is to determine the effect of a proposed lock to stop the swift tidal currents which now make navigation in the waterway difficult.

Some idea of the complex problems presented in this investigation is indicated in the fact that the average rise and fall of the tide in Cape Cod Bay, a sea level waterway, is five feet greater than in Buzzards Bay. There is also a tide-time difference of three hours between the bays. As a result, the tide in Buzzards Bay is rising while



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BIOCRACY

Does the Human Body Contain the Secret of Economic Stabilization?

BY WALTER B. CANNON

IT IS reported that Henry Ward Beecher began one of his sermons with the words, "It's a damn hot day." You will perhaps pardon me if I take as my text, "Civilization is in a hell of a mess."

The expression seems justifiable because it is so exactly descriptive. Grain elevators bulging — and thousands of hungry waiting in line for bread; growers of cotton and wool unable to dispose of their stocks — and children suffering from nakedness; factories idle — and men willing to work in them shut from their doors! Nothing could be more cruelly stupid and witless than the situation revealed by these contrasts.

Financiers have tried their hand at solving the problem — tried for three long years, and the greatest of them, Sir Montagu Norman, has said recently, "I approach the subject not only in ignorance, but humility. It is too much for me." Managers of great business interests have suggested a national economic council or a trade association with power to coördinate production and consumption, but these suggestions have proved futile. More than eighteen months have passed, with nothing done. Labor leaders also have entered the lists, calling for shorter days and shorter weeks; but with millions idle already that remedy does not seem to be fundamental. Finally, a new group has taken hold. They have appropriated the slogan "Technocracy," which has seized popular fancy; they have started an energy survey of the country, they promise an overthrow of the

**A PHYSIOLOGIST LOOKS AT THE
BODY BIOLOGIC AND FINDS SUG-
GESTIONS FOR THE ADJUSTMENT
OF THE BODY POLITIC**

price system, and ultimate abundance for everybody. What all these efforts intend is a replacement of the present hell of hunger, nakedness, demoralizing idleness, and fear with the plenty and security of the

kingdom of heaven. I wish to suggest that the kingdom of heaven is within us!

WE ARE made of most unstable stuff. The eye is sensitive to an amount of energy represented by 5 trillionths of an erg. A momentary interruption of the blood flow through the brain and at once the processes subserving consciousness are interrupted. The minute pulses which pass along nerves cause relatively enormous explosions in muscular contraction. When we consider the extreme readiness of our bodies for disturbance by the slightest application of external force, their persistence in the hurly-burly of the world seems incredible. And yet for years they not only withstand knocks and cuts, bacterial attacks and internal stresses, but maintain throughout a marvelous uniformity. A survey of organic evolution reveals that this achievement has been gradual. But here we have in our own personal structure something which, through thousands of centuries of hard experience, has learned the trick of keeping stable.

How is it that the body has achieved this extraordinary feat? It has done so by means of self-regulating devices which preserve constancy of the conditions of its living parts. We commonly think of ourselves as air-

inhabiting animals. As a matter of fact, however, we are separated from the air which surrounds us by a layer of dead stuff, the horny scurf of the skin, or the watery mucus of the moist surfaces. All that is alive within these lifeless coverings is in fact bathed in fluid. We are essentially water-inhabiting animals. This watery fluid, composed of the circulating blood and the salty lymph in the boggy places outside the vessels, makes what the great French physiologist, Claude Bernard, called the "internal environment," or, as I prefer to call it, the "fluid matrix" of our living units. Now the extraordinary fact is well established that this fluid in which we are immersed is kept by the organism in a remarkable state of steadiness and that such steadiness is of the utmost importance for our well being.

Let me illustrate by a few examples. Normally there are 100 milligrams of sugar in 100 cubic centimeters of blood. If the concentration should fall to 50 milligrams, convulsions, coma, and death might supervene. The regular calcium content is 10 milligrams per cent. If it should drop to 5 milligrams, convulsions would occur; if it should rise to 20 milligrams, the blood would become so viscous that it would hardly flow. The blood has a slightly alkaline reaction. If it should shift from its very slight alkalinity to the very least degree beyond the neutral line into an acid reaction, coma would at once occur; and if it should become only a little more alkaline there would be convulsions. If the body temperature should rise to 108° or 109° F. and continue at that elevation for some time, certain cells of the brain would undergo irreversible changes. If the temperature should fall, effective action would be stopped. The temperature of the body, however, is kept at such a uniform level that the thermometer-makers can put out instruments in vast numbers, with the temperature 98.6° marked upon them, assured that the ordinary range of variation from that figure in people all over the world will not be more than two degrees.

Now just insofar as the fluid matrix is maintained constant, we are freed from both internal and external disturbing factors. All we need do to make this point clear is to observe what happens in one of the lower vertebrates in which the stabilization of the fluid matrix has not been evolved. At this time of year, for example, the frog, which cannot control its body temperature, must sink to the bottom of the pool and there remain, stiff and inactive, during the winter months until the warmth of spring allows him to renew his motions. We, as warm-blooded animals, can expose ourselves to extremes of both heat and cold and keep our muscles going at a uniform rate because of the uniformity of the temperature conditions in which they live and move and have their being.

The question next arises as to how the body manages to keep this steady state in its internal *milieu*. It does so by means of two devices, according as materials or processes are involved. For example, the food which we eat each day, to some degree, no doubt, is promptly used, and some of it may be stored in the liver ready to be set free as sugar, and some of it may be more permanently stored as fat. By means of storage, therefore, materials which are taken in when there is abundance are set aside for use when there may be need. Such is the





Nesmith

provision for constancy of supplies. Or, if processes are involved, the arrangements in the organism are such that these processes are either accelerated or retarded in order to secure a steady state. Thus, we are continuously producing heat and continuously discharging it into our surroundings. If the body temperature tends to fall, the outward passage of heat is automatically checked by excluding the warm blood from the skin; and if that does not stop the fall, the heat-producing functions of the body are stimulated for a faster burning of fuel. Or, should the body temperature tend to rise, sweating and dilation of the surface vessels occur so that the process of heat-loss is speeded up.

Let us consider for a moment what happens when a man engages in a mile run. The active muscles utilize sugar. This would tend to lower the sugar content of the blood — a condition which, as we have seen, is associated with danger. Under these circumstances, however, sugar is released from storage in the liver so that the danger is avoided. The muscular efficiency of man is only about 25%. The heat given off as a result of muscular contraction would soon raise the temperature of the body to a disastrous height if it were not promptly and continuously dissipated. Indeed, I have calculated that in a four-mile rowing race the oarsmen would, at the end of the third mile, be stiff in coagulation if they could not get rid of the extra heat! But sweating occurs, the sweat evaporates and cools the skin, the hot blood flows through the cooled cutaneous vessels, and thereby a disastrous consequence is avoided. Again, immense amounts of non-volatile lactic acid are produced by muscular effort — enough to overwhelm quickly the alkaline buffer salts contained in the circulating blood. That would result, of course, in a shift of the reaction of the blood to the acid side of neutrality and in prompt onset of coma. No such dire catastrophe occurs, however, because, as soon as exercise begins, the heart beats more rapidly, the blood pressure rises, and more oxygen-carrying corpuscles are set free from storage. Under the higher head of pressure all the corpuscles move faster from lungs to muscles and back again, so that extra oxygen is delivered to burn the non-volatile lactic acid to volatile carbonic acid, and that, brought to the lungs, is blown away in the heavy breathing of exertion.

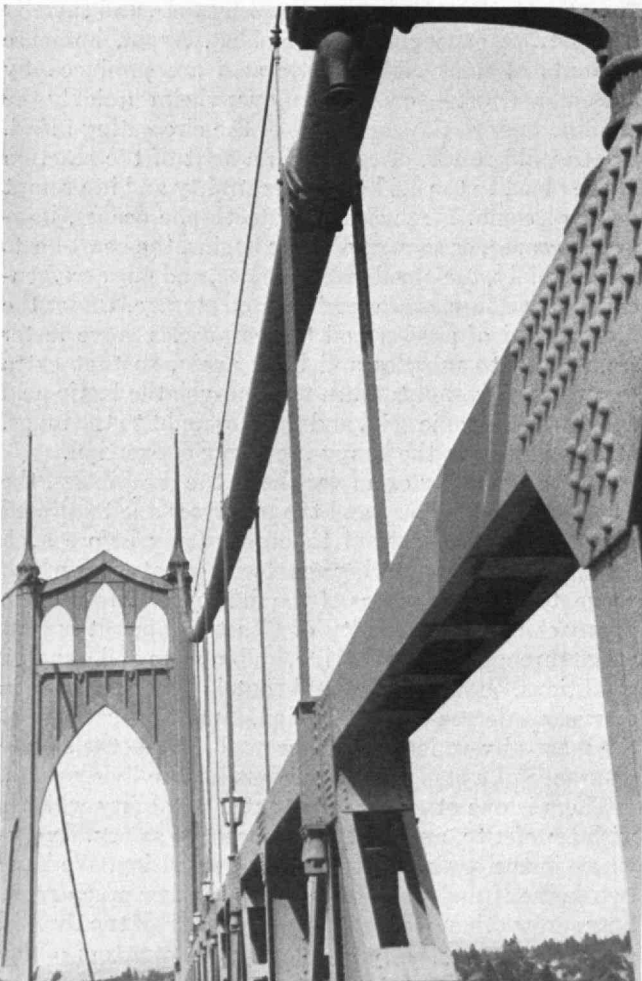
As the foregoing examples show, the disabilities, the coma, the convulsions, and the paralyses due to altered states are not permitted to occur. Long before such conditions arise, rectifying agents are set at work which prevent the disturbances of the fluid matrix from even approaching the proximity of disaster. Thus it is that we go through our years of life, and in spite of deranging conditions, both inside and outside, we exhibit a marvelous degree of stabilization. Note the economy of the means by which this is accomplished — the simple assurance of a steady environment for the living parts.

There is one other arrangement for stability which I wish to refer to, and that is the factor of safety. Everywhere in the organism we find that provision. We have two kidneys and need only one; we have much more lung surface than we require; more than half the thyroid gland can be excised, more than three-quarters of the pancreas can be removed, and a great extent of the small intestine can be extirpated — all without serious

disturbance of bodily functions. It is obvious that our bodies are not built on a niggardly and skimpy plan, but have abundant margins of security.

NOW what has all this to do with social maladjustment? It seems to me that quite possibly there are general principles of organization that may be quite as true of the body politic as they are of the body biologic. Just as in the body biologic there is extensive division of labor, just as there are myriads of working cells that are specialized in their various tasks, fixed in their positions, and only remotely related to sources of necessary supplies, so likewise in the body politic, workers have become more and more specialized in their tasks, more and more fixed in their positions, and less and less capable of securing by their own efforts the food and other provisions which they require. They, like the cells of the living organism, are dependent on a fluid matrix for their necessities.

What now corresponds in the body politic to the fluid matrix of the body biologic? It seems to me that the analogue is found in our system of distribution in all its aspects, in our canals, rivers, roads and railroads, in our steamships, trucks and trains — all serving, like the blood and the lymph, as common carriers; and there should be included also our wholesale and retail purveyors who represent the less mobile portions of the system.



J. R. K.

St. Johns' Bridge, Portland, Ore.

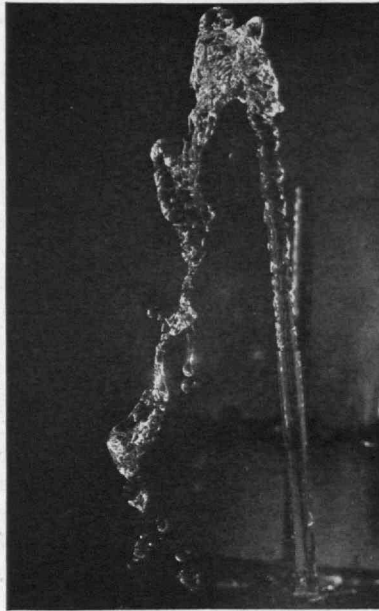
In this vast and intricate stream, whose channels and side branches reach more or less directly all communities, goods are placed at their source for carriage to other localities, much as materials flow from one part to another in our bodies. In these other localities there are also sources of goods which are likewise placed in the stream. In the body politic, however, it is permissible to take goods out of the stream only if goods of equivalent value are put back in it. In order to facilitate this process of exchange, money is employed, or its temporary substitute, credit. Money and credit, therefore, become integral parts of the fluid matrix of society.

To assure in the social organism the same degree of stability that has been obtained in the animal organism, our bodies suggest such control of the social fluid matrix that its constancy would be maintained, a condition which involves certainty that the moving stream will deliver continuously the necessities of existence. Food, clothing, shelter, the means of warmth, and assistance in case of injury or disease, are, of course, among these necessities. Stability would also involve assurance of continuous remuneration of individual labor, labor which would produce exchangeable goods and which would be paid a sufficient wage to allow the laborer to take from the stream the necessary things which he and those dependent upon him require. In the light of biological experience, therefore, social stabilization should be sought, not in a fixed and rigid social system, but in such adaptable industrial and commercial functions as assure continuous supplies of elementary human needs.

What are some of the other suggestions which the stability of the organism offers? First, it suggests that stability is of prime importance. It is more important than economy. The organism throws away not only water and salts but also sugar, when they are present in excess. This is uneconomical, but it preserves constancy. The convulsions which occur when the sugar supply runs too low and the violent shivering which appears when the temperature is much reduced are extreme activities, wasteful of energy, and not ordinarily employed because milder measures suffice. They are ready, however, if by chance needed, to keep uniform the fluid matrix. I cite them here merely to show that in critical times in our biological system economy is secondary to stability. The generous provisions of factors of safety in the body give further support for this view.

The organism suggests also that there are early signs of disturbance of stable states which, if sought, can be found. Such warning signals are known in the body biologic. It is hard to believe that there are not similar warning signals in the body politic. The discovery of sensitive indicators of dangerous fluctuations in the commercial stream would be of the utmost social importance.

The organism suggests further that the importance of stability warrants a specially organized control, invested by society itself with the power to preserve the constancy of the fluid matrix, that is, the processes of commerce. It seems to me that this involves power to adjust reasonably supply to demand, power to lay aside stores of goods which could be released in emergencies, power to require accumulation (*Concluded on page 227*)



A jet of water stops to pose for its portrait. Another high-speed photograph made with an exposure of 1/50,000 of a second by means of a new electrical circuit development by the Department of Electrical Engineering at M. I. T.

Machinery and Unemployment

Effects of Science and Invention on Modern Life

BY DUGALD C. JACKSON

MEN love slogans. Recently it was *laissez-faire* which was to be man's industrial salvation; now it is the "technological age" which is to be man's moral destruction. A "moratorium of invention" has been proposed for the purpose of restraining the monster machine. And we have had Technocracy, whose marshaling of statistics and publication of conclusions reminds one of Harry Lorrequer's debonaire friend whose French always showed him to be English and his English proved him Irish.

Now slogans are invented to coax or frighten the stupid and child-like. They seldom express sound groupings of facts. They often are as void of life substance as a child's "pumpkin-head" specter used to frighten the unwary on a Halloween night. To analyze properly the "machine age," it is necessary to use modes of attack similar to the kind that are fitted for exacting scientific research into the causes and effects of observed natural phenomena. The philosophical method of deductive political economy is rather helpless in such a situation.

Machinery, in its larger physical sense as here used, is physical means for substituting mechanical power (in part or in whole) in place of muscular power. My subject, "Machinery and Unemployment," seems to me to be synonymous with the expression "Scientific Discovery and Invention *versus* Unemployment." The conception, development, and advantageous use of machinery requires more creative brain power than does reliance on muscle power.

The pace of invention has been continuous during human history, but in recent centuries it has been greatly accelerated. The origins of such early mechanical

elements as the lever, the wedge, the screw, the wheel, and the pulley are obscured in the night of unrecorded history, but we can picture them as the inventions of men struggling to achieve their ends with reduced muscular effort. That is, the desire even then presumably (as today) was to increase the ratio between results accomplished and the muscular effort exerted.

In the rather recent generations, purposeful scientific research attached to itself the affections of many chosen men and a great fund of previously unobserved or obscure facts and relationships in nature sprang into a steadily enlarging stream of discoveries. From this stream arose a tremendous stimulus to invention, and the making of machines took on a pace of extraordinary acceleration. Thus we arrive at our present generation. It is worthwhile to date this period of acceleration.

Near the end of the Eighteenth Century a new era began, the era of James Watt and his steam power. The spinning jenny, crude hydraulic turbines, and other machines of a kind were already utilized in a small way before Watt's great inventions. But out of Watt sprang the machine age. Motive power for such machines as were known prior to him was either man power, dumb-animal power, small units of inefficient water power, or perhaps here and there some wind power. Transportation on land was by animal power, and on water by sail or oar; long-distance communication was by human runner or rider. Some pumping had been done by steam power. Thereafter came a multitude of inventions which made the industrial revolution.

The conditions of living for the great mass of the people responded in all ages to the then state of science and invention, and in this respect the rolling out of



Cushing

"Working and Planning," an industrial photomontage

history exhibits many contrasts during the ages. Our present-day western assurance of life and our modes of living depend on the present state of inventions. Even preventive medicine depends, through sanitation, on modern basic inventions. Their fruits guide our modes of life and we expand their scope by further discovery and invention. One of the features of our present quarter-century is the growth of organized industrial research, which purposefully broadens the field of old methods and diligently seeks knowledge which serves in founding new applications or even complete new industries.

SPACE allows for only a suggestive enumeration of several of the betterments which these influences have introduced into western life and employment, and the contrasts of living in the present-day, western world compared with life of the Seventeenth and earlier centuries. An impressive impediment to securing a mental picture of these betterments and contrasts lies in the almost insuperable difficulty of divesting one's mind of habitual ideas which arise out of our relatively safe, stable, and comfortable modes of living and our accompanying partial suppression of superstition and hopelessness. These results are here. We have been brought up immersed in them. They are a part of us. We practically cannot conceive a world divested of them. This is not a field for deductive argument. It is a field for exacting examination of facts and the inductive drawing of conclusions. Difficult as this is, due to lack of early data, it may be partially accomplished.

One who will study ardently the life of the mass of people in Germany, France, Great Britain, the Scandinavian countries in earlier times, cautiously excluding inferences caused by his own present environment, may secure some picture of the sordid squalor and crushing hardships of living, and the tenuous tenure of employment and even of life, in those times. A study of outdoor museums exhibiting former living facilities, such as museums now to be seen in Scandinavian countries, can add to the vividness of the picture. A citizen of this country who has not deeply studied the matter cannot establish for himself a sufficient picture of the isolated, unkempt village life, existing without transportation or communication facilities for months in each year, and of a very dilatory and uncertain character even in the best seasons; with food for each year dependent definitely upon the smiles of nature in that year, regardless of individual effort; without sanitation and with small medical facilities; with slight and crude means for heating; with clothing dependent solely upon neighborhood facilities and the home production of the year; with substantially unchecked, murderous lawlessness abroad; with no means and no hope for safely accumulating provision for the proverbial rainy day or for old age. Under these conditions, the uncertainty of employment, the poverty, the hardships, and the hopelessness of the mass of people were too deep to compare intelligibly with conditions in the present-day western world. The dependency of the aged and the sick was pitiful beyond description.

Those conditions gave opportunities for individuals possessing sufficient strength and brutality to wring extravagant wealth out of the mass of their fellow beings; which wealth, compared with the poverty of the then masses of the population, made a disparity incomparably greater than the present-day disparity of individual wealth which is often criticized by the superficial as something new and horrible.

Conditions comporting with the old conditions of the western world still characterize inland provinces of China, where periodic famines decimate the population, violent death is commonplace, sufficient food is seldom available to the mass of the population, poverty is extreme among the masses, unemployment and beggary stare almost every individual in the face; but a special few possess extraordinary power and wealth. These conditions in China are not due to lack of productiveness of the land on its surface or beneath its surface, nor to over-density of population, which is far beneath the population-density of our state of Massachusetts. The deplorable conditions are due to lack of heat-power transportation, quick communication, and effective production and sanitation processes which are the outcome of modern inventions.

The sordidness, superstition, and misery of life for a large proportion of the population of India is incredible to most people of the western world, but even that has been ameliorated by the prevention of decimating famines and epidemics through a partial application of steam-power transportation, electric communication, and a bit of application of sanitation. One of the remaining deep-seated causes of poverty in India is the absence of any reasonable degree of recognition there of

the dignity of the human man-hour compared with the work-hour of beasts. The foremost labor unions of the United States have gained deserved eminence partly from such recognition, either reasoned or tacit.

Those who allege that the general introduction of machinery has been the cause of an unfair, disparate distribution of wealth and an over-all instability of employment in this age compared with earlier times, must have failed to examine the facts and their relations, upon which the truth of such allegations must rest. Observation and figures, as such exist, show that the opposite effects have been operative in America and western Europe during the age of machinery. They further indicate that no such disparity of wealth or control of life, between individuals, now exists in these western countries as the disparities which characterized the feudal age in Europe and still characterize certain eastern countries where life is established under the mantle of ancient classical influences and where modern science has little penetrated.

The lesser disparity of wealth between the low and the high in the western world today has its major roots in two things: the high level of stability and comfort in the conditions of living which now characterize the conditions of the low and are fruits of invention and machinery; and the lessened command over the life of the low which is now possessed by the high which is also in partial degree a fruit of invention and machinery. The advantages are derived by the women in a degree which raises them to substantial equality with the men.

In the western world the modern era of scientific discovery and invention has been accompanied by many changes in human relations. Not the least of these are greater stability of living, more enlightened scales of living, uniquely larger proportions of the populations owners of property and in relatively well-to-do circumstances, less disparity between means of living for the high and the lowly. It is inevitable that such changes, occurring in notable degree in less than two centuries, have had a dominant influence on modes of life and work, including the conditions of employment. It is not sufficient to visualize only industrial employment, however, because the age of machinery has affected all walks of life and all sorts of employment.

LET us look at this more closely from the aspect of contributing greater wholesomeness and comfort to life as we live it, compared with the life of our ancestors. Scientific invention and machinery have stabilized conditions of living and likewise of employment in so many eminent features that we are prone to forget the origins of our assurance and our conveniences. Some basic examples which are direct outcomes of invention and machinery are enumerated herewith:

1. Inter-access made easy between regions of plenty and regions of scarcity and want.
2. Production and storage of goods against seasonal needs made convenient and economical.
3. Preservation of perishable goods like food and food-stuffs made practicable and convenient against seasonal needs.
4. Enlargement of scope and area available for credit facilities from any financial center made easily adaptable to community interests and needs.

5. Quality of foods and medicines improved, controlled, and assured.

6. Adequate, continuous supply of potable water in urban areas made possible.

7. Safety and comfort provided by means of brilliant and economical artificial lighting.

8. Definite sanitation effected in urban and rural regions.

9. Means provided for controlling epidemics and plagues.

10. Even medicine and surgery (whose chief reliance for improvement is on scientific discovery and improved technique) also have been beneficently influenced by the progress of invention and machinery.

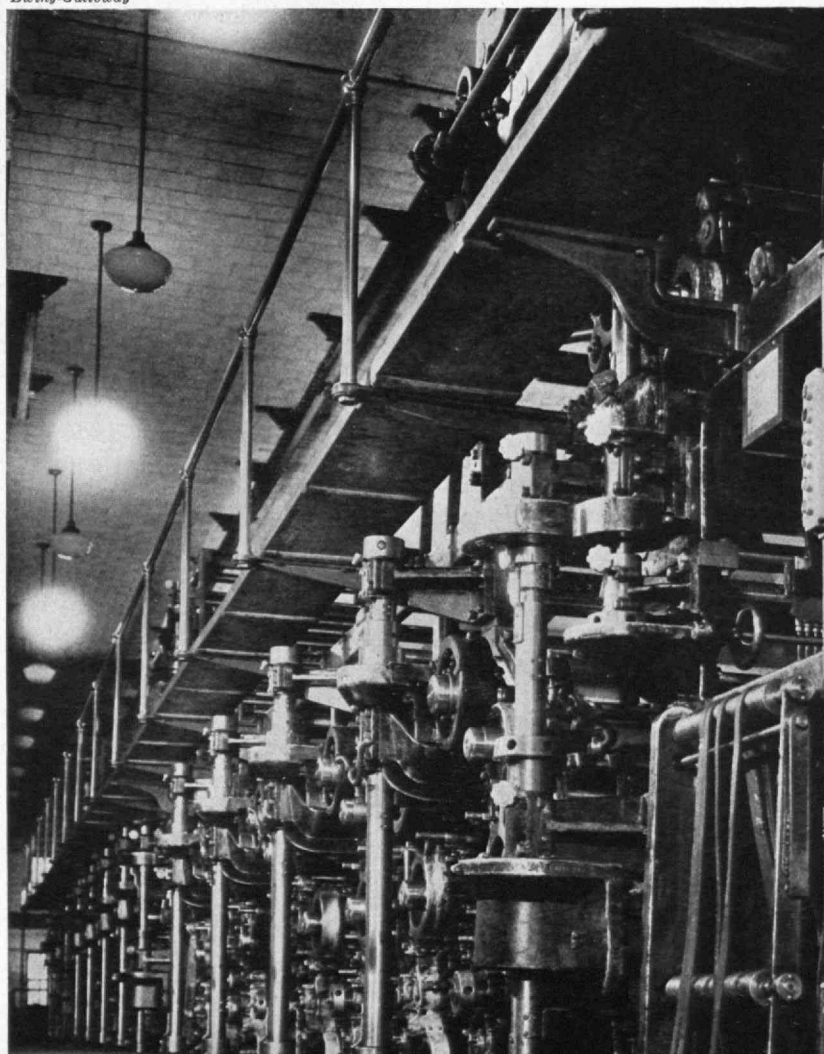
The record from which these are examples is too patently full of goodness, and further advances are too hopeful, for the western world to risk the effect of laying the heavy hand of restraint on the general movement, notwithstanding the disadvantages arising from factory concentration. We must restrain only the detail features from which arise abuses and hardships.

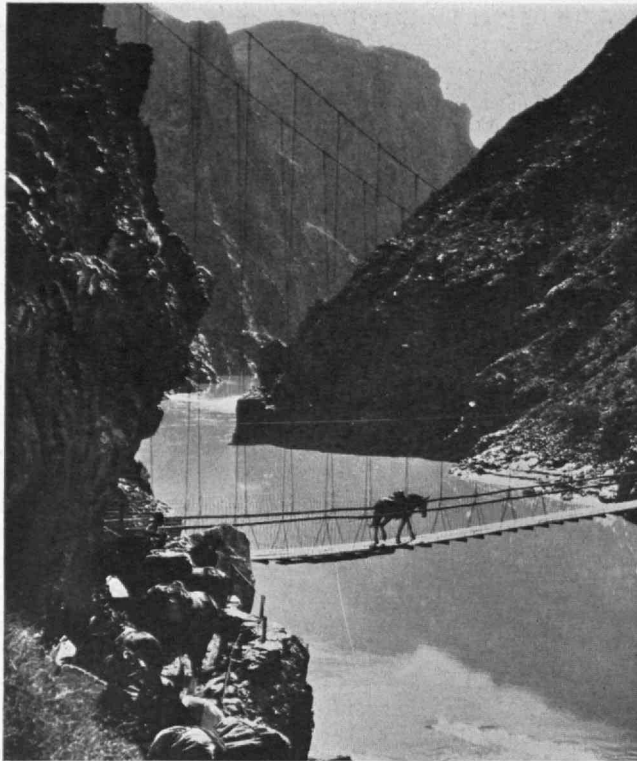
The developments have profoundly changed the relations of man to man, zone to zone, nation to nation. They have introduced a new kind of division of labor, which is the substitution of the forces of mechanical power in place of muscular power with a marked consequent emphasis on mental skill; in contrast from the old division of labor which merely shifted the application of muscular forces, with little change in the demand for mental skill. Adaptation of labor is a better term than division of labor to represent modern conditions.

The crassly ignorant and superstitious serf or churl might now be at a disadvantage compared with two centuries ago because he would have no one as an

Heavy-duty, high-speed, double sextuple press for printing 100,000, 48-page tabloid papers per hour

Ewing-Galloway





H. Armstrong Roberts

Crossing the Colorado River by the Kaibab Trail Suspension Bridge in Grand Canyon

owner to lean on, but mental skill in small or moderate degrees has been lifted in level. Against the back-set for a serf or churl, education has been developed with one of its objectives to wipe out that class by instilling some degree of mental skill.

The crushing load of hard muscular work has been removed by the adaptation from the backs of the poor. The old-time work period, beginning before sunrise and ending after sunset, has been lifted from the poor, with part of its burden transferred to mental effort. The early factory period, an 84 or even 90-hour week, has come down to the 48, 44, or even 40-hour week, and it seems in course of further shrinkage associated with increasing production and a concurrently increasing relative and actual compensation to the workers. The dignity and power of the human mind makes it appropriate to relieve man-labor by substitution of machine-labor in drudge work, and invention is accomplishing the result. Contrasting the miserable state of coolie rickshaw pullers and their families in the Orient with the condition of occidental automobile drivers and their families pictures the result.

Machinery also has lifted the burden of autocratic oppression from the shoulders of artisans. The picture often ascribed to earlier days, of independent, artistic-minded artisans executing in woods, metals, and leathers independent conceptions of artistry, is a very pretty one to sketch, and it is often sketched; but truth compels the confession that commonly the workmen in those days were heartlessly driven day and night by craft or guild leaders to whom they were substantially slaves. No such heartless treatment of free workmen would now be tolerated in the western world as formerly characterized the treatment of serfs, churls, and apprentices.

Less exchange of goods being now performed by barter has made a stable money of major importance to us as a measure of relative values and an intermediate medium of exchange. Cheapened cost of production through use of machinery has accompanied lessened hours of muscle-workers' labor, whether on the farm, in transportation, in production, or by association in commercial operations. Such revolutionary changes, however good in themselves and however contributory to the welfare of those least able to individually care for themselves, usually leave a trail of difficulties or abuses in their wake because rectification lags behind the principal movement. It is these difficulties and abuses which are now being vociferously denounced or deplored by many speakers and writers. They must be faced, studied, and eliminated; but this should be done in due recognition that they are separate and detail sores all associated with a comprehensive major movement which of itself and in a comprehensive way deserves definite support. It is important to carry on in this way because in this era we are more dependent, mutually, on each other than ever before. If this attitude is adopted, the abuses can be cured and the comprehensive advantages retained. If the opposite attitude is adopted, we are likely to be thrown back into the more ancient type of difficulties and abuses, which are indescribably worse than those of the present age.

One of these difficulties appears in this country to be a notably lessened stability of employment for the man whose capital is his muscular strength unsupported by mental skill. Another appears to be an increasing instability in the greatly increased average demand for workers of relatively moderate skill in handicraft, and particularly of the clerical or white-collar class.

When considering the effect of machinery on employment and the level of earnings, it is necessary to consider more than the particular trades wherein machinery is used in a major way and the collateral trades relating to machinery manufacture. The over-all numbers of gainfully employed must be considered. The influence of the larger total of transactions (if a larger total is produced) on employment in commerce and finance must be evaluated; and the analysis must be further extended to the great service industries like transportation, electric communications, electric power generation and distribution, illumination, and several others.

Modern economic statistics are by no means complete and those existing have not been subjected to a satisfactory analysis or effective interpretation. It is not without significance, however, that in the United States, which now is a highly mechanized nation, the proportion of the population ten years of age and older in gainful occupations has varied in census years only six or seven per cent from its average figure during the 50 years from 1880 to 1930, and the proportions of the population thus employed were little different at the beginning and at the end of the period, the difference being about four and a half per cent of the gainfully employed.

Nevertheless, during the same time a large change occurred in the percentages employed in differently classified occupations. The (Continued on page 224)



Mining and Metallurgy

Freight planes on the small landing field at Bulolo gold camp, Papua, British New Guinea. The gold dredge in the foreground and all other equipment was transported to the spot by airplane. See below

Mining from the Air

How Airplanes Serve the Mining Engineer and Economic Explorer

By J. J. ROWLANDS

HIGH in the mountains of British New Guinea on the great island of Papua, which lies in the Coral Sea north of Australia, two huge electric dredges are working in the gold-bearing sands of the Bulolo River. This fact, which ordinarily might be interesting only as an item of mining news, is unusually significant, for this lonely mining camp stands in a tropical jungle hemmed in by mountains towering to an elevation of 5,000 feet, through which there are no roads and no waterways from the coastal village of Lae, some 50 miles away. The obvious suggestion that all that is Bulolo must have dropped from the sky is literally true.

The use of native carriers in pack trains by a jungle trail, the only other transportation method, had been estimated to cost nearly \$5.00 per pound of pay load, that is, per pound of load carried over and above the supplies needed for the

carriers themselves. To construct a roadway, which would have to be 90 miles long, would take two years, cost a million dollars, and be prohibitively expensive to maintain against landslides and washouts. In 1927, the Guinea Airways, Ltd., an Australian firm, arrived on the scene and began a service to the gold fields in a small wood and fabric plane. The plane was not to prove very durable under the conditions encountered, but the idea was successfully demonstrated. At the outset of 1928,

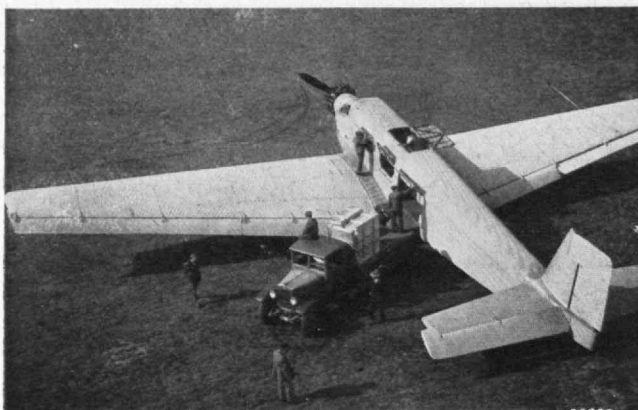
the company purchased a large single-engine Junkers all-metal transport plane, designed to carry freight loads up to one ton, or uncomplaining passengers, such as miners or Kanakas, up to thirteen.

By 1930, operations in the gold fields had progressed to a point where extensive, elaborate, and bulky equipment was required. Two 10 cubic foot bucket dredges, a 3,000 horse power hydroelectric



Canadian Airways, Ltd.

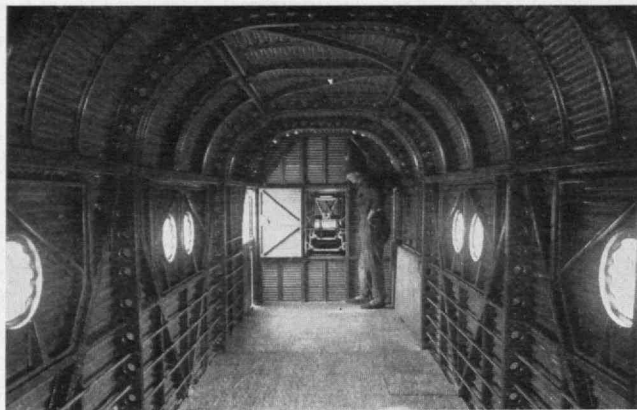
The old and the new in mining transportation in the north countries



Loading a Junkers plane designed for carrying mining equipment and supplies

plant and sundries were needed, a total estimated at 2,500 tons. Again the road project was considered and abandoned. Instead, two larger Junkers transports, this time powered with three Pratt and Whitney Hornets, were ordered. A few changes were made so that they could accommodate the largest and heaviest irreducible units, and the final freight compartments were 24 feet long, 78 inches wide, and 80 inches high. The maximum loads run as high as 7,000 pounds, although the usual cargo is nearer 5,000 pounds. The average freight haul cost by airplane has proved to be less than four cents a pound.

What has been done at Bulolo in the face of most unfavorable climatic conditions, including an annual rainfall of nearly 200 inches and an average temperature of 80° F. is a striking illustration of the dramatic part aircraft are playing in economic exploration.



Interior of a Junkers all-metal freight plane capable of carrying a load of 7,000 pounds

No country has reaped greater profits from the use of the airplane in exploration and mining than Canada. In the discovery of mineral deposits and in their development, the Dominion has accomplished more in the past five years than in the previous 20 years. The country with its thousands of lakes and waterways is ideal for aerial exploration by ships equipped with pontoons for water landings and with skis for winter operations.

By airplane a prospector may now cover in two weeks a territory greater than he could examine by canoe or pack train in six months. Equipped with sectional canoes, tents, and supplies, prospectors are quickly transported by planes to various promising locations and left to investigate the region. Within a stated period the plane returns, and if a prospector has made no discoveries, he is taken to a new location. If he has staked claims, he is rushed by air to the nearest mining recording office.

In the preliminary work the prospector is aided by the reports of flying geologists, who have perfected a technique for identification of geological formations from the air. In the testing of discoveries, the work has been facilitated by the quick transportation of tools and machinery at a great saving in time and expense.

The possibilities for aerial exploration and transportation in Canada are indicated by a glance at the map of the Dominion, which has a total area of 3,648,723 square miles. North of a comparatively narrow band along the southern border of the country lies a vast



Canadian Airways, Ltd.

Above: Portable, sectional canoe for stowing in planes. Left: Prospecting in the silver country of Northern Ontario in 1914 when canoes were the chief mode of transportation. The author stands on the left



Northern Aerial Mineral Exploration, Ltd.

Tremendous quartz vein, 60 feet to 100 feet wide, Bathurst Inlet, an arm of the Beaufort Sea

territory broken by innumerable lakes and rivers, but virtually without benefit of railways. Until the coming of the airplane, the dog sled and the canoe offered the chief means of transportation.

The airplane has not only greatly facilitated development of the country, but it has raised the morale of the people who live far from civilization. The assurance of quick contact with cities hundreds of miles away has contributed much to peace of mind and physical welfare, a fact of particular significance for the future settlement of vast areas of land ideally adapted for growing wheat and other grain crops.

The deposit of pitchblende, the ore of radium, at Great Bear Lake in the Northwest Territories is being developed almost entirely by the aid of air transportation. This mining camp, near the Arctic Circle and 1,000 miles from civilization, has in the past year become a substantial settlement, with a hotel, post office, Royal Canadian Mounted Police post, and a score of mining buildings. Much of the machinery was taken in by air, and ore is being shipped out by the same means. The first Canadian Airways plane landed at Great Bear Lake in 1929, and since that time 300 passengers and 120,000 pounds of freight have been carried by this line. Other airplanes operated by mining companies have accounted for a large tonnage in the process of opening what promises to be the world's richest source of radium.

The Northern Aerial Minerals Exploration, Ltd., early entered upon a program of aerial exploration with a fleet of planes that have penetrated to almost every



Northern Aerial Mineral Exploration, Ltd.

Replacing engine in plane with the temperature 50° below zero at Fort Rae, Canadian Northwest Territories

district in the North. The Coppermine River district near the Arctic coast attracted attention because of reports that the country contained copper deposits. The records of early explorers mentioned that Indians and Eskimos of the region used implements of the metal. A comprehensive plan for prospecting the country resulted in the discovery of unusually rich bodies of copper ore. Copper in the form of sheets of almost pure metal was found, but the most valuable deposits occur in the form of bornite. Other planes of this company operated in the Baker Lake district northwest of Hudson's Bay, and in flights to the east coast of the bay staked valuable iron deposits on Belcher Island.

Planes of Dominion Explorers, another prospecting organization, have been active in various districts of the North. In addition to such organizations, many individual prospectors own planes. (Continued on page 228)



Northern Aerial Mineral Exploration, Ltd.

Above: Fairchild cabin monoplanes anchored on Great Bear Lake after having brought in prospectors and supplies. Right: Fairchild plane flying along the coastal Andes in Peru





Oliver Heaviside (1850-1925)

A PORTION of Oliver Heaviside's personal library is now on exhibition in the M. I. T. Library, with a number of autograph letters and other memorabilia. These were gathered together by the late Dr. B. A. Behrend, who was for many years one of Heaviside's warmest friends and supporters in this country. The exhibit constitutes the first and only showing in America of this material, which will shortly be sent over to England to be united with similar Heavisidiana in the library of the Institution of Electrical Engineers.

Although recognized at the time of his death in 1925 as "un des plus grands savants," ranking with "the greatest philosophers, Archimedes, Newton, Kelvin, and Faraday," and acclaimed by Sir Oliver Lodge as "a mathematical genius of exceptional ability," Heaviside lived the greater part of his life in poverty and obscurity. His three volumes of *Electro-magnetic Theory*, coördinating the earlier *Electrical Papers* separately published, are now consulted by all serious students of mathematics, physics, and electrical engineering. Through the "Heaviside-Kennelly layer" and "Heaviside's operators" his name has come to be linked with present-day investigations to which he made valuable contributions forty years ago. "From the practical point of view," however, states Alexander Russell, "Heaviside's most important work was laying the foundation of the modern theory of telephonic transmission; a theory which has proved a veritable gold mine for the practical telephonist."

In these intimate letters to Dr. Behrend, as well as in the annotations abounding in the pages of his books, we get a glimpse of the personality and temperament of this retiring genius which adds great interest to his published writings. Refusing as he did to take part in the public discussions of his day, he seems to have enjoyed a solitary debate with the scientific writers whose works he read, scattering notes, markings, and

Oliver Heaviside

As Seen in His Books and Letters

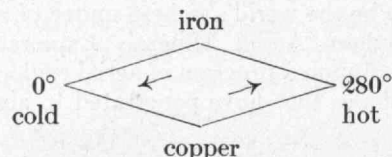
BY KATHARINE MAYNARD

mathematical computations through to the very endpapers of these volumes from his personal library.

How often are his authors "vague," "wrong decidedly," "bad and wrong," "very irregular," "wrong, wrong," "monstrous." He finds a certain method "very clumsy"; questions "Why" and "Why not?" frequently; and asserts bluntly here and there: "Won't do"; "Don't need so many apologies"; "Don't like this demonstration — See my note for a simpler one"; "This way is academical humbug"; "Rot, rot"; "Nonsense!"

The exactness and precision of Heaviside's own methods are reflected in numerous comments. Thus, after a statement of the analysis of sulphate of copper he takes pains to total the percentages, adding 100 in pencil. Opposite a footnote in Perry's *Applied Mechanics* explaining that a bicycle "geared to 53 inches goes at 10 miles per hour when the pedals make one turn per second," we find the correction: "Should be 56 very closely." Again, when his friend Perry gives a "Mnemonic" for a certain equation, Heaviside's directness advises: "Call it Law or Rule."

In an early work on telegraphy where a footnote on the voltameter reads: "It is necessary to use platinum, as the oxygen combines with all oxidable metals," this self-taught purist expostulates: "that is to say, the oxygen combines with all metals which combine with oxygen!" He would even amend Lord Kelvin's discussion of thermoelectricity, exclaiming: "This terminology I find provoking in the extreme. Difficult to make head or tail of it. Put it this way, and I can understand it." This is followed by his own explanation with a diagram of the thermocouple familiar to every student:



Another chapter of the *Mathematical and Physical Papers*, that on the "Restoration of Mechanical Energy from an Unequally Heated Space," finds Heaviside equally critical. He verifies, or improves upon, the computations here given with an eloquent "Oh! Thomson!" in the margin, and pronounces at the close this considered verdict:

"I am bound to say that the above paper is not worthy of Thomson's genius. Such extraordinary blindness. No doubt caused by his sticking to μ instead of adopting absolute temperature referred to dilatation of a perfect gas . . ."

Living as a recluse from the age of twenty-four, Heaviside nevertheless enjoyed communion with a selected circle of warm friends (*Continued on page 234*)

THE TREND OF AFFAIRS

Our Supply of Energy*

By ARTHUR B. LAMB

MANY human characteristics or capabilities have been suggested as criteria of mankind's progress in civilization. It seems to me that one of the most significant and fundamental of such criteria is the *per capita supply of available energy*.

Aboriginal man's sole source of energy, to maintain his bodily temperature above the mean temperature of his surroundings and to make possible the muscular work that he performed with his hands and arms and legs, was the food that he consumed. This must have afforded a total energy supply per capita of about 3,000 kilogram calories per day, and since the thermodynamic efficiency of the human body then was presumably not very different from what it is today, this would in turn have permitted the expenditure of about 500 kilogram calories of free energy; that is, the performance of that amount of mechanical work.

With the discovery of fire, a considerable increase in total available energy occurred, which, averaging over the various races of primitive men and their various environments, may be taken as about 3,000 kilogram calories per capita per day. This energy did not, however, provide any additional supply of free or mechanical energy.

An increase in mechanical energy was first secured from the domestication of the horse, ox, ass, and so on. Assuming one such draught animal to every five human beings, the per capita increment in total energy corresponding to their food was 1,600 kilogram calories, corresponding to an increment of free energy of 400 kilogram calories. Further increases, particularly in free energy, occurred when sails, windmills, waterwheels, and so on, and most of all when the steam engine and our present prime movers were invented.

Today, on the average, the world over, every individual has at his disposal 22,000 kilogram calories of total energy and 5,000 kilogram calories of free energy or power; that is, 7 or 10 times as much as aboriginal man. Today, in the United States, each of us on the average has 150,000 kilogram calories of total energy and 30,000 kilogram calories of power; that is, respectively, 50 and 60 times as much as aboriginal man!

It is this huge increment of power without a corresponding understanding of its socialized control which is doubtless the fundamental cause of our present industrial and economic distress and our social unrest. Better control, distribution, and coördination of this energy is the most pressing problem of the human family today. Nevertheless, there can be no question that mankind

will steadily strive to secure and in the end will secure an even greater per capita energy supply. It is worthwhile, therefore, to examine our energy reservoirs and the possibilities of conserving, increasing, or adding to them.

TABLE I

ANNUAL SUPPLIES OF ENERGY FROM PRESENT SOURCES
FOR THE WORLD

Source	Amount	Total Energy Kg. cal. $\times 10^{14}$	Power Kg. cal. $\times 10^{14}$
Coal.....	1.4×10^9 tons	91	18.2
Oil.....	2×10^8 tons	20	4
Wood.....		9.1
Gas.....	5×10^{10} m ³	5	1
Waterfalls.....	3.6×10^7 h.p.	2	2
Draught Animals..	3×10^8	20	4
Windmills.....	1×10^6	0.5	0.5
Sailing Ships.....	1×10^6 tons	0.1	0.1
Men.....	2×10^9	30	4
Total.....		177.7	33.8

TABLE II

ANNUAL SUPPLIES OF ENERGY FROM PRESENT SOURCES
FOR U. S. A.

Source	Amount	Total Energy Kg. cal. $\times 10^{14}$	Power Kg. cal. $\times 10^{14}$
Coal.....	6×10^8 tons	42	8.4
Oil.....	1×10^8 tons	10	2
Wood.....		4.2
Gas.....	4×10^{10} m ³	4	0.8
Waterfalls.....	1.3×10^7 h.p.	0.7	0.7
Draught Animals..	1.8×10^7	1.2	0.3
Windmills.....	5×10^4	0.02	0.02
Sailing Ships.....	3×10^5 tons	0.03	0.03
Men.....	1.2×10^8	1.8	0.24
Total.....		64.0	12.5

The world's reserve supplies are as follows:

TABLE III

WORLD RESERVES OF PRESENT SOURCES OF ENERGY

Source	Amount	Total Energy Kg. cal. $\times 10^{14}$	Power Kg. cal. $\times 10^{14}$
<i>Total Supply</i>			
Coal.....	6×10^{12} tons	400,000	80,000
Oil.....	1×10^{10} tons	1,000	200
Gas.....	2.5×10^{12} m ³	250	13
Total.....		401,250	80,213
<i>Annual Supply</i>			
Wood (Plants)....	3×10^{10} tons	1,300	260
Waterfalls.....	4×10^8 h.p.	21	21
Total.....		1,321	281

Any considerable increase in per capita energy supply in a highly industrialized country like ours will entail, in addition to the better economic organization referred to above, a further increase in the efficiency of power production, and, at the start, from our present sources of energy, chiefly coal. Much can doubtless still be done with our present prime movers. The over-all efficiency of the steam engine has been increased from

* Dr. Lamb recently presented a discussion of the per capita supply of available energy before the Northeastern Section of the American Chemical Society. Because of widespread public preoccupation with "energy surveys," The Review presents a résumé by Dr. Lamb of his discussion and in doing so acknowledges its indebtedness to *The Nucleus* of the Northeastern Section.



Carnegie Institute of Washington

Steam wells Nos. 1 and 2 in Sonoma County, Calif. As Dr. Lamb points out adjacently, there is a possibility of utilizing this natural superheated steam in producing power

15% in 1919 to 28% in 1932 and this should continue, though at a diminishing rate. The mercury turbine is relatively in its infancy, and may be congenitally limited in its possibilities, but it already exhibits an efficiency of 34%.

An alluring possibility is the fuel cell, using carbon or carbon monoxide as one depolarizer and air as the other. The electrochemical feasibility of such cells at 800° C. appears to have been convincingly demonstrated and their operation at room temperature is not entirely out of the question.

Other sources of energy are shown below:

TABLE IV

WORLD RESERVES OF POTENTIAL SOURCES OF ENERGY.

Source	Total Energy Kg. cal. $\times 10^{14}$
Heat of Earth.....	24,000,000,000,000
Solar Energy to Earth..... Annual	13,000,000
Solar Energy to Surface of Earth..... Annual	4,000,000
Winds..... Annual	300,000
Water in Clouds..... Annual	30,000
Total Annual Reserves.....	17,330,000

Terrestrial heat, present in such huge amounts and available only a few miles from every point on the earth's surface, at first appears very promising. One would think that deep shafts might be sunk and the subterranean heat used to generate steam. Simple calculations show that this is wholly out of the question. The only hope is to take advantage of the accidental supplies of hot water, or better, of superheated steam occurring in certain volcanic regions, such supplies, for instance, as Count Conti has utilized with conspicuous success in Italy and as Dr. Allen believes can be utilized in Sonoma County, Calif.

Ocean heat is also available in huge amounts and has actually been utilized by George Claude — but to date the pumps he has to operate have consumed more energy than his immense turbines have generated. He assures us, nevertheless, that the method can be made an economic success.

Tidal energy is a further possibility and is advantageous in that it involves relatively little uncertainty or further invention. The most hopeful project of this kind is probably the largest one; namely, that at Passamaquoddy in the Bay of Fundy. This is expected to yield 500,000–700,000 K.W. at a capital cost of between \$140 and \$200 per K.W. Today, with prime movers twice as efficient as they were 20 years ago and getting cheaper all the time, such projects are less promising than they used to be.

Solar energy is another immense potential supply. In full sunlight, approximately a horse power of light

energy falls on every square yard of the earth's surface thus illuminated. If, for instance, all the light energy that falls on Boston's 43 square miles could be converted into power, the output would surpass the total present output of power in the United States.

Chlorophyll succeeds in converting 50% of the light energy it absorbs into chemical energy, but how it achieves this is still a mystery. Relatively little, however, of the incident light energy is absorbed by the chlorophyll in leaves, so that the most prolific of green plants in growing only manage to utilize in this way three or four per cent of the light energy that reaches them.

The conversion of light energy into heat energy to operate engines is inherently wasteful, for it does not take advantage of the high potential of light energy; indeed no such solar engines have as yet been able to compete with our ordinary sources of energy.

The most hopeful development in this connection appears to be that of the photoelectric cell, particularly the cuprous oxide cell and the silver selenide cell of Lange. It is claimed that several watts of energy per meter have been obtained from the former and 50 to 150 times as much from the latter. This would correspond to a utilization of perhaps 50% of the incident light, which is probably an exaggeration; but if its efficiency were only a fraction of this, such a cell would still seem to offer great possibilities, even though it is stated that the capital cost is at present so high as to make its utilization on a large scale quite out of the question.

Summarizing, it can be said that the further development of our present prime movers and of the fuel cell, the utilization of favorable supplies of terrestrial heat and, possibly, of tidal energy, and the development of the photoelectric cell to utilize solar energy offer every expectation of cheaper and more abundant power in the future; and that the realization of these possibilities is

chiefly dependent upon our ability to organize human society in such a way that it can take advantage of these developments as they are made.

Bicentenary of the Firebrand Philosopher

MARCH 24 (March 13 old style) is the 200th anniversary of the birth of Joseph Priestley, the dissenting English clergyman who dabbled in chemistry for his own amusement and discovered oxygen. He also discovered various other gases, nitric oxide, nitrous oxide, hydrogen chloride, ammonia, sulphur dioxide, silicon fluoride, and carbon monoxide. He recognized the similarity between combustion and respiration, observed that green plants in the sunlight produce oxygen, devised the pneumatic trough for collecting gases over water or over mercury, invented soda water, and wrote voluminously on political and theological subjects.

His attachment to the chemical doctrine which supposed the real existence of a fiery principle, phlogiston, and the vigor with which he expressed his political and theological opinions are both indicated by the epithet of "firebrand philosopher" which was applied to him. He favored the French patriots of the Revolution as he also favored the patriots of the American Colonies. He wrote a reply to Burke's book on the French Revolution, and Burke repeatedly inveighed against his character in the House of Commons. When the French made him a citizen of their country and a member of their assembly, his position in England was further damaged. As a dissenter, he advocated complete religious freedom. He was an open enemy of all religious establishments, in particular of the Church of England, and he would not suppress his inclination toward controversy for the sake of popular opinion. The feeling against him culminated in the Birmingham riots of 1791, on the day of the anniversary of the French Revolution. The meeting house in which he preached was burned, his house and the houses of several of his friends received the same treatment, his library and apparatus, and the manuscripts upon which he had been engaged for many years were destroyed. Priestley escaped to London in a mail coach under a borrowed name. Here his colleagues of the Royal Society refused to admit him to their meetings. His sons had emigrated to America, and in 1794 he followed their example.

Priestley had strong enemies in England, but he also had intensely partisan friends. Copper penny and half-penny tokens, which circulated in his time, still exist. They bear his effigy on one side, and on the other sometimes a picture of his chemical and electrical apparatus, sometimes the name of the business house which issued them, and laudatory mottoes: "Joseph Priestley, Citizen of the World," "Great Christian Philosopher," and so on. We have at hand the silver medal which commemorates his removal to America. It gives the date of his departure from England, April 8, and that of his arrival in America, June 4, 1794 (old style, of course), "Leaving the shores of Britannia he went to Columbia," and around the circumference of it, in Latin, "Go, Our Ornament, Go to take advantage of better fates."

Priestley was welcomed hospitably at New York on his arrival. Later in the month he proceeded to Philadelphia, which was then the capital city of the United States, and shortly thereafter, having refused an offer of the professorship of chemistry in the University of Pennsylvania, he definitely settled at Northumberland, Pa., where he built a house, installed his library and laboratory, and resumed his theological writing and chemical experimentation. He came to Philadelphia occasionally to preach in the Unitarian Church or to attend meetings of the American Philosophical Society, of which he became a member. He died at Northumberland, February 6, 1804, and is buried there. His house still stands. A smaller fireproof building has lately been erected on the grounds and serves as a museum for the safe-keeping of books, manuscripts, apparatus, and other Priestley memorabilia.

A special exhibition of Priestley material will be held this year at Philadelphia under the auspices of the Franklin Institute, the University of Pennsylvania, and the First Unitarian Church of Philadelphia in the rooms of the Pennsylvania Historical Society for one month beginning March 23. Priestley material in the Library of Congress is being collected and will be exhibited during the week of March 26 while the American Chemical Society is meeting in Washington.

For Americans the importance of Joseph Priestley is even greater than the already great importance of the discoverer of oxygen. He stimulated enormously the growth of science and culture in the new country. He had been a friend and frequent correspondent of Franklin. He was a friend of Washington, whose religious views he liberalized, and of Jefferson with whom he was entirely in accord. Not a single American chemist of the



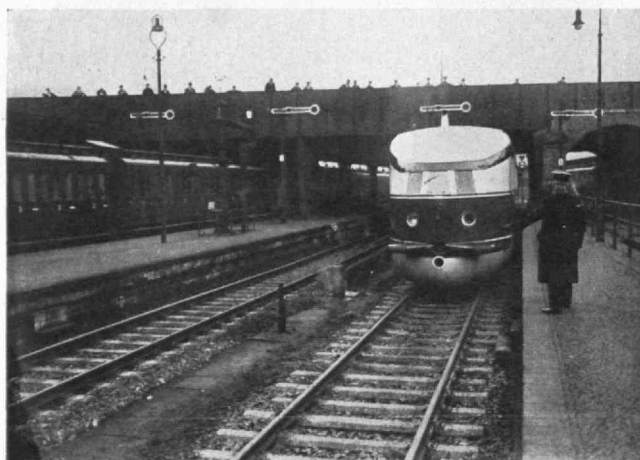
Josiah Wedgwood, the great English potter, was a friend of Joseph Priestley's and is probably responsible for the casting of the Wedgwood medallion of Priestley reproduced above

time accepted the outmoded phlogiston doctrine which Priestley defended to the last, but they all gave respectful attention to his views, and the best of them were moved to set forth their own and to perform experiments. Modern chemistry in this country really began with Priestley. A group of chemists, meeting at Northumberland in August, 1874, to celebrate the centenary of the discovery of oxygen, found inspiration there which led two years later to the organization of the American Chemical Society.

During the period of his residence in this country, Priestley discovered carbon monoxide but made no other chemical discoveries of great importance. He continued his controversy with the "French school of anti-phlogistic chemists" and published several pamphlets in defence of the older doctrine which his own discoveries were largely instrumental in overthrowing. They are written in the splendid English which he always wrote. They are sometimes caustic, often witty, and not infrequently wistful. They show that chemistry was after all his secondary interest, that his primary interest was theology. The second edition of "The Doctrine Of Phlogiston Established, And That Of The Composition Of Water Refuted" (dated Northumberland, 1803, but actually printed after the author's death) contains a letter addressed to the French chemists, which ends as follows:

"On the opening of this controversy I told Mr. Adet* that I should have greater pride in acknowledging myself convinced, if I saw reason to be, than in victory, and should surrender my arms with pleasure. I was sincere in that declaration; and certainly the conquest of a man's prejudice is more honourable to him than the discovery, or the most successful defence, of any truth. This, however, I must, for the present at least, decline, and leave it to you; contenting myself with the inferior praise of confirming the hypothesis for which I have contended. If, from the politeness habitual to Frenchmen, you should decline this honour, thinking my claim

* Adet was Ambassador of France to the United States. He had been one of the group which coöperated with Lavoisier in devising and publishing a new system of chemical nomenclature.



Keystone

Streamlined Flying Hamburger, the auto-train being tested by the Deutsches Reichsbahn. It averaged over 75 miles per hour on its trial trip and attained a maximum of nearly 100. In length 138 feet, it seats 102 passengers and is powered by two 410 horse power Maybach-Diesel motors with direct-drive generators

to it better founded than yours, I may hereafter be induced to receive it; but for the present, yielding to you a palm more glorious than that of any victory, and trusting that your political revolution will be more stable than this chemical one, I am, with the greatest respect, Gentlemen, Your fellow-citizen, Joseph Priestley."

The preface of the same work concludes with a passage which proved to be prophetic:

"I am truly thankful to the sovereign disposer of all things, and to those friends of science who have defrayed the expenses of my laboratory, that I have been able to do so much; and I hope my liberal benefactors will not repent their generosity. Indeed, the greater part of them are gone before me, to a state in which I shall hope soon to join them, where I can again express my gratitude, and when we may again unite our respective abilities in the same pleasing pursuits; seeing more of the wisdom and goodness of the great creator, and having our admiration and devotion excited to a greater height than ever."

A Way Out for the Railroads?

GERMANY'S new auto-train, nicknamed the *Flying Hamburger* or *Hanseatic Flyer*, provoked worldwide comment when it was introduced by a 178-mile trial trip between Berlin and Hamburg at an average rate of 75.8 miles per hour and attained at times a maximum of 96.3. This it did, according to the consensus of newspaper correspondents who rode it, with such ease and absence of the discomfort to its passengers that they were "barely . . . sensible of moving at a speed greater than that of a very fast train." Soon this new auto-train is promised a place on regular scheduled running and will thus have a chance to demonstrate its possibilities for offsetting the inroads of airplane and bus competition by providing faster and more frequent passenger services with greater time-table flexibility and reduced operating charges.

The *Flying Hamburger*, some of the details of which are given in the caption of its photograph which appears adjacently, is the latest of several experiments of a similar nature undertaken by the *Reichsbahn*. One of these, a car 85 feet long, driven by an air propeller and capable of 100 miles per hour, was noted in *The Review* for December, 1930. Another was the so-called "rail Zeppelin" designed by Franz Kruckenberg and tested between Berlin and Hamburg in the summer of 1931, at which time it is said to have reached a speed of 143.75 miles per hour. Such a speed was, however, not altogether commensurate with existing track facilities.

The latest adventure of the *Reichsbahn* appears to be a much more practicable affair. It is articulated in the middle, the two halves being closely coupled and vestibuled over the central truck. Also the care paid to streamlining is especially obvious in the blunt-nose, cowling shielding the running gear and pulled-down roof, flush windows and vestibules, and recessed door-handles and headlights.

Two 410 horse power Diesels, which permit the auto-train to be driven in either direction, average but 10.36 pounds per horse power, a remarkably low ratio. Their mounting on the terminal trucks relieves the required

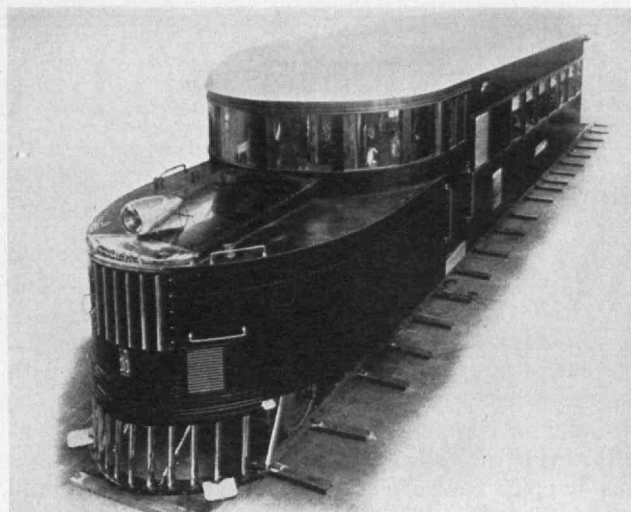
load to be sustained by the body and thus permits a saving of weight in its design. Also the tubular construction of the body, the fore-and-aft rigidity of which is practically entrusted to the longitudinal angle-iron members, has operated to lighten the car. This latter feature, however, makes the *Flying Hamburger* unfitted to withstand the buffing and jerking which must be absorbed by cars coupled in a train. Thus it will have to run by itself, or possibly with an equally light trailer.

This absence of "train strength" makes the future of the new auto-train dubious except as an auxiliary, particularly if one considers the possibilities of its type for American railroads. For certain passenger services it would seem to possess superior qualities but mail and express are chief sources of revenue for most of the important trains in this country and, as one American railroad executive has expressed it, "this car is precluded from carrying either, except in the very smallest quantity, because of its small size." Except for its passengers, he continues, "there isn't room for much of anything else. Another thing that militates against it is that it can only be used advantageously on long runs. It is unavailable for suburban service. It cannot accommodate a sufficient number of passengers, for one thing, and then it does not have time to 'work up' to its highest speed between stations and so get the benefit of that speed which is its principal asset."

Even though the *Flying Hamburger* may not prove a "way out" for all the ills of the railways, it does mark an important step in the history of self-propelled rail motor cars. In the United States the idea of using this type of vehicle was broached as early as a quarter century ago but the period of its consideration on any extended basis may be said to have begun right after the War. To this activity the truck manufacturers who, as a result of the cessation of hostilities, found themselves deprived of what they had come to treat as a normal market, doubtless contributed. During the last decade the building of rail motor cars, in this country, has been marked by a tendency to increase their size and weight. The typical car of 1922, for example, fell within a range of 400 to 700 pounds per passenger seat while that of 1932 lay between 1,600 and 1,900.

It would now appear that a reversion to the earlier practice may take place due to the possibilities for saving weight as exemplified in the experiments of the *Reichsbahn*, the more extensive use of newer types of light but strong alloys, and the attempts to employ rubber tires on rail cars to perfect their riding qualities. The quest for a more successful means of adapting pneumatics to vehicles designed to operate on steel rails has furnished an objective for countless experiments.

Such a car was tried with some success in the summer of 1931 in France on a branch line between Palaiseau and Chartres. It was a 24 horse power affair, seating 24 persons, and was equipped with tires of a special shape, stronger and thicker than those used on automobiles, in order to bear the greater weight of the railway coach. Later, in March, 1932, the combination of light-weight construction and pneumatic tires was first demonstrated to American railway men on American rails. It proved so interesting that shortly afterward three railroads ordered cars of this type which, the



Keystone-Underwood

An American streamlined rail car built in Michigan by the Clark Equipment Company. The body is of aluminum and the power is furnished by an internal combustion engine

Railway Age has said, embody "the most radical departure from conventional ideas of railway equipment ever made in a single step." In America the E. G. Budd Manufacturing Company is building pneumatic-tired cars under license from Michelin et Cie., of France.

The latest European rubber-tired rail car is apparently that of the Austro Daimler-Puchwerke Company in Vienna in the design of which the pneumatics are not in contact with the rails. Each wheel of this car is really two distinct detachable disk wheels, the outer ones having steel flanged tires running directly on the rails, while the inner ones have pneumatic tires bearing against the internal flat surfaces of the steel tires. The pneumatic-tired wheels have their own axle which ordinarily bears the load and is connected in the usual manner by leaf springs to the chassis. It is claimed that in the event of a puncture on this car between stations it is not necessary immediately to stop for repairs because the load can temporarily be absorbed by the guiding axle.

The persistence of all these studies and experiments looking toward the perfection of the rail car is especially commendable under present conditions and, it is to be hoped, is probably more significant of the future trend than the fact that but 14 such cars were ordered in the United States last year as compared with 26 in 1931, 54 in 1930, and 132 in 1929. This opinion is supported by figures which show capital expenditures for improvements and new equipment on the American roads were last year more drastically lowered than ever before. Miles of road abandoned in this country last year totaled 1,452; and only 163 new miles were built, the smallest figure of any year since the Civil War.

The records also show, for example, that no railroad in the United States placed an order for a steam locomotive with an outside builder during 1932, that no electric locomotives were ordered, that 12 locomotives (including internal-combustion types) comprised the total number placed on order from all sources in this country during the year. This even-dozen figure compares with 235 in 1931, 440 in 1930, 1,212 in 1929, and an average of 981 in the five years up to 1929.

THE INSTITUTE GAZETTE

Annual Alumni Dinner

WITH 416 present, the 1933 Alumni Dinner, held on February 4, was one of the most satisfying in the point of attendance of any held in many years. In 1932 the attendance, including lady guests, was 306 of which only 185 were alumni. This year, with the exception of ten specially invited women, all of the attendance represented Technology alumni.

It was a carefully planned dinner and the program was happily conceived. As President of the Alumni Association, Dr. Allan W. Rowe, '01, presided. His great gifts as a speaker were amply exemplified by the grace, dignity, and deftness with which he conducted the program. As speakers he presented President Compton who elaborated on his annual printed message to the Alumni which is reproduced below; Dr. Walter B. Cannon, George Higginson Professor of Physiology at the Harvard Medical School, whose provocative address is printed on page 203; and Sir Willmott H. Lewis, Washington correspondent of the *London Times*. Calling the dinner an acceptable form of "Technological Unemployment," Sir Willmott spoke with eloquence and wit of governmental and international affairs. He deplored the predicament of the world's three great democracies wherein the popular power of veto has outstripped the

power to command and rendered impotent the constructive and recreative powers of the government.

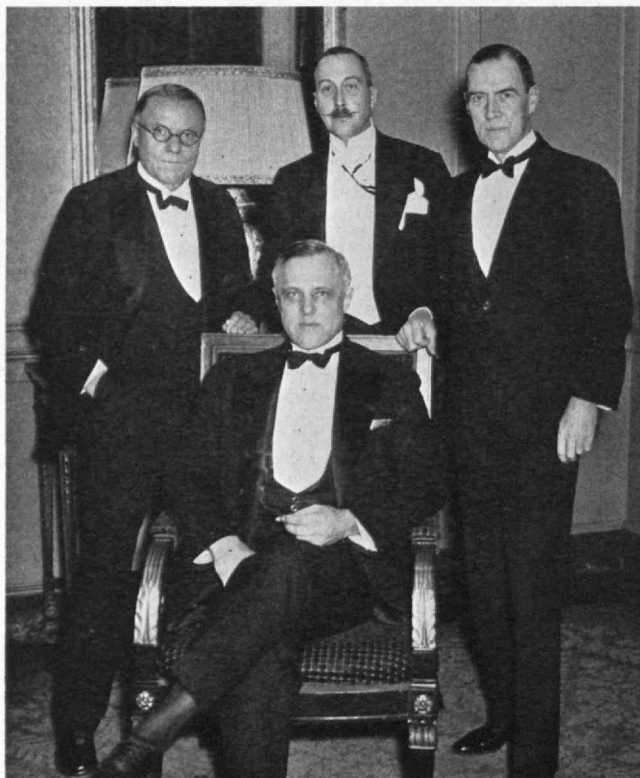
Preceding the Dinner, the Institute presented an elaborate exhibit which included an operating model of the Van de Graaff high-voltage generator; a portable, cathode-ray oscillograph; a double Geiger counter for detecting cosmic rays; experiments with the Edgerton stroboscope; an apparatus built by the Physics Department by which parallel rays of light are scattered (as though by a diffraction grating) by compression waves set up in a liquid; an electrodialysis apparatus for the purification and concentration of enzymes (constructed by the Department of Biology and Public Health); and a pressure gauge capable of measuring pressures up to 20,000 pounds per square inch, built by the Research Laboratory of Physical Chemistry.

The Dinner was concluded by the singing of the Stein Song, the first time, according to Dr. Rowe, it had ever been sung correctly at a Technology gathering. Stephen S. Townsend, formerly Director of Choral Music at the Institute, led the singing. The Committee in charge of the Dinner included Henry B. Shepard, '16, (Chairman), Allan Winter Rowe, '01, Raymond S. Stevens, '17, Hamilton L. Wood, '17, Percy R. Ziegler, '00. Dr. Compton's annual message to Alumni, which was printed and distributed at the Dinner, is quoted below in its entirety:

"In these times of social uncertainty and economic difficulty our Institute has an unprecedentedly strategic opportunity for service of a most fundamental value to society. Its object is to impart that knowledge, train that judgment, and develop that social outlook which combine to produce constructive accomplishment, wise leadership, and effective coöperation in this 'scientific age.'

"Since this is a scientific age it is reasonable to suppose that men who have a real working knowledge of science and its applications should be peculiarly well fitted to deal with its problems. This should be especially true where the logic of science is joined with the practical accomplishment of engineering and the creative imagination of architecture, all with due reference to principles of economics. This combination is found in our curriculum, which may be thought of as our platform for world service. Granted this platform, and its proven effectiveness, what can we do still more effectively to produce men who will accomplish, lead, and coöperate?

"Consider first our curriculum. All with one accord are ready to admit that it is a stiff one. That is all right. It is also true that its set requirements leave but little time free for study or thought on the initiative of the student himself. That is not so satisfactory. In the third and fourth years the student may have to take as many as 11 subjects simultaneously. That is certainly undesirable, for it leaves little time for digestion and orientation. It emphasizes the contrast between college, where his work and thought are planned in meticulous



Boston Herald

Speakers at the Annual Alumni Dinner on February 4. Seated: President Compton; standing, left to right: Dr. Walter B. Cannon, Dr. Allan Winter Rowe, '01, and Sir Willmott H. Lewis

detail by the curriculum, and after life where he must plan and steer his own course. On accepted pedagogical principles, it would seem wiser to allow the student progressively more responsibility and initiative as he advances toward graduation, so that he may pass easily from college to professional life, having acquired ability to exercise judgment in control of his actions, and habits of independent study, as well as the habits of industry and the knowledge and skill which are developed by our present curriculum. I am pleased to report that a special committee of the Faculty, appointed to investigate possibilities of improving our upper class curriculum, is now working on a plan of revision of the curriculum.

"Last year I pointed out the increasing importance of our post-graduate work, and my belief in our unique opportunity for leadership in this field. This view was supported by a statement of the Council of the Society for Promotion of Engineering Education, at its annual convention last summer: 'The future developments of engineering education will be principally in the field of post-graduate training.' A practical illustration is found in the markedly greater success of our graduate students in securing positions in these difficult times, as compared with our graduating seniors.

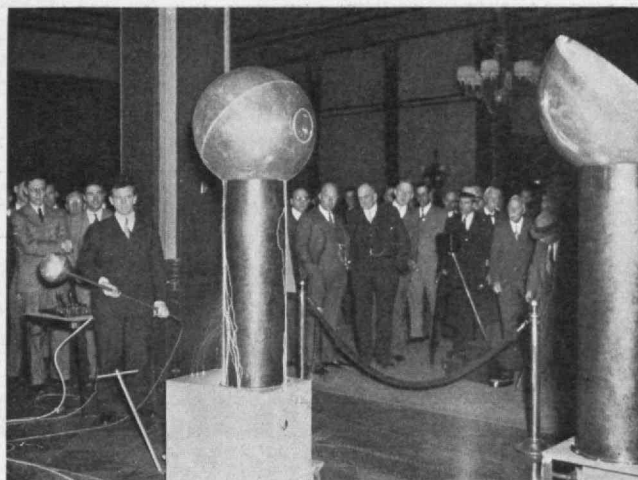
"Graduate students now lack almost completely the social contacts which the undergraduates enjoy through their manifold organized activities. Their cultural development, and hence their social effectiveness, depend upon such contacts. It was Dean West of Princeton, who stoutly and successfully championed the idea that the most natural cultural training comes from free social intercourse between men of differing interests but of equivalent intellectual outlook.

"To promote those contacts, which will aid in developing qualities of leadership and coöperation among our graduate students, we propose to see what can be done with our present facilities to create a Graduate Housing Plan. A considerable portion of the old dormitory will be set aside for this purpose. Its furnishings will be made more attractive. Lounge and reading rooms will be set aside for the group. The House will be under the general supervision of a 'Master'—a qualified young member of the Faculty—aided by a house committee. The group will dine together once a week in the North Hall of Walker, and perhaps more frequently if the plan finds favor, with a very brief after-dinner talk by a guest speaker. It is proposed to put this plan into effect as rapidly as graduate students elect to participate in it. Although handicapped by the separation of living and dining quarters and by the somewhat unfavorable layout of the dormitories, it is nevertheless believed that the new plan will be a distinct contribution to the value and interest of graduate training.

"These two items are selected from among many efforts of the Corporation, Alumni, and Staff to increase the value of our work. Some interesting details of our operations are shown in the chart on the next page."

The 163d Council Meeting

THE Alumni Council assembled for dinner at 6:45 p.m. in the North Hall of Walker Memorial on January 30 with a total of 67 members and guests



Boston Herald

The Van de Graaff generator which is being built at Round Hill to generate 10,000,000 volts was thus shown in model form at the Alumni Dinner

present. In the absence of O. B. Denison, '11, the Technology cheer was given in a fitting manner under the leadership of Dr. Rowe.

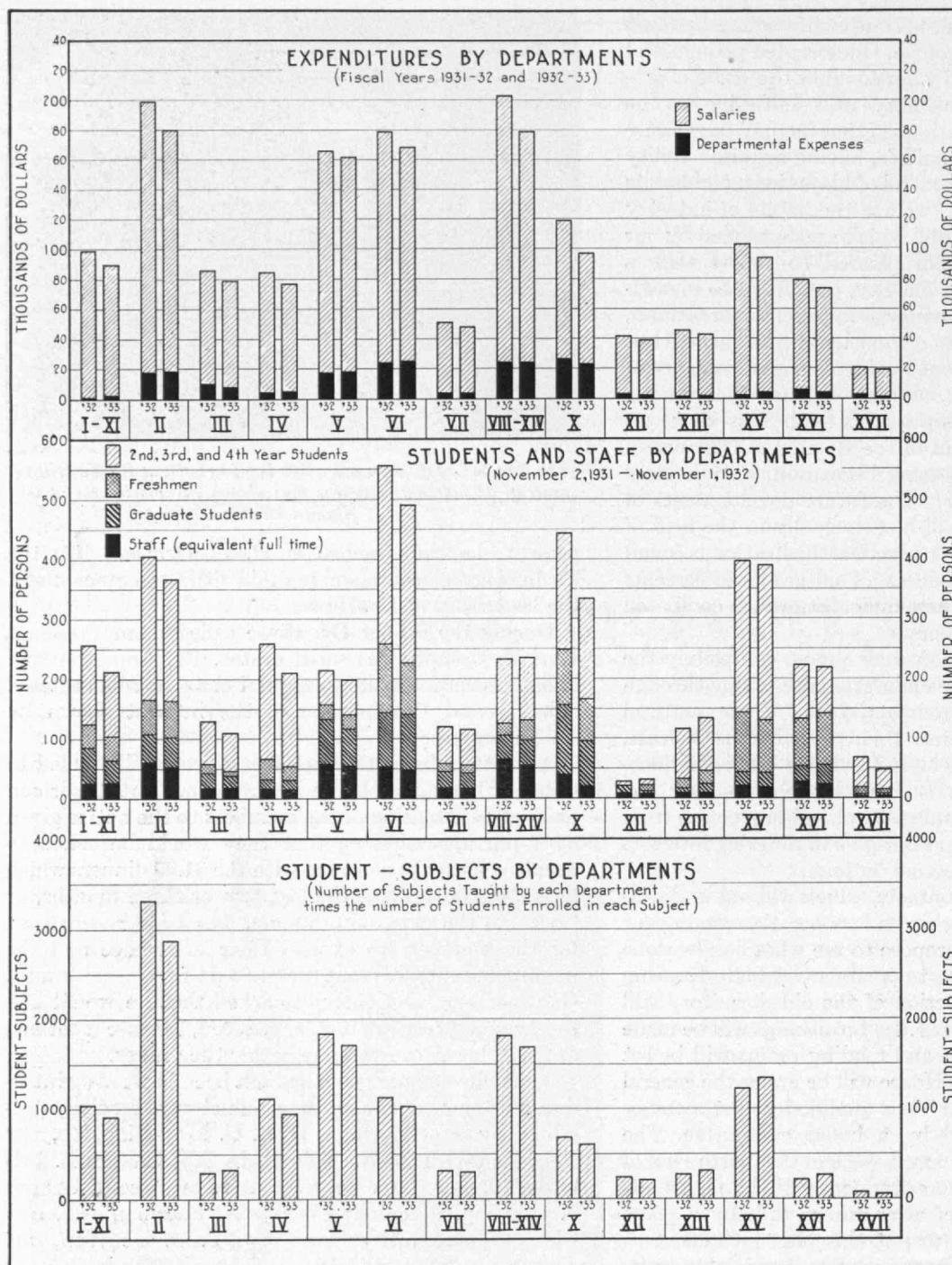
During the dinner Dr. Rowe called upon President Karl T. Compton as salad orator. Dr. Compton told about his recent visits to alumni clubs in Schenectady, Albany, and Baltimore, and the interest shown by Technology men.

After the dinner the meeting was officially called to order by President Rowe at 8:00 p.m. The Chairman first called attention of the members to the notice given at a previous meeting that they would be asked to decide whether to continue with the \$1.25 dinners which have been served for the last two or three months, or revert to the old \$1.50 dinners. The time had arrived for the members to express their preference and the unanimous vote was that the \$1.25 dinners be continued. One member facetiously remarked that he would like to have the price still further reduced, because it seemed as if the lower the cost the better the dinner.

The following men who had not been previously introduced as new comers on the Council were officially presented by the Chairman: W. L. C. Moy-Ding, '20, new Representative for the Shanghai Club; Charles L. Fellows, '79, new Class Representative in place of Charles S. Gooding, deceased; Charles W. Sherman, '90, new Class Representative in place of J. O. De Wolf, '90, deceased.

The Secretary reported that at the meeting of the Executive Committee held that afternoon the Treasurer of the Alumni Association had stated that the letter prepared by President Rowe and sent out under his name in solicitation of sustaining members had brought gratifying results. As of the preceding Friday, \$2,065.00 had been received from 153 alumni, or an average of \$17.40 each, while last year 184 alumni contributed \$2,130.00, or \$11.60 each. The Editors of *The Review* had stated that dues collections up until January 30 had totaled 5,359, which was 1,427, or 21%, less than on January 30, 1932.

The Committee on Resolutions for the late Morris Knowles, '91, consisting of George Gilmore, '90, Chairman, Gorham Dana, '91, and S. C. Prescott, '94, pre-



Graphical analysis of departmental expenditures, staffs, and students at M. I. T.

sented these resolutions, which were read by Mr. Dana. All rising, it was voted that these resolutions be accepted and spread on the records of the M. I. T. Alumni Association and that a copy be sent to the family.

The Chairman referred to the recent death on December 24, 1932, of one of our old Council members, Charles S. Gooding, Representative of the Class of '79.

Dr. Rowe invited suggestions as to how there might be aroused quickened interest in alumni affairs on the part of hundreds of alumni located around Boston. The question of bringing guests to the Alumni Council meetings was discussed by Messrs. Godfrey L. Cabot, '81, A. W. Rowe, '01, Ingersoll Bowditch, '00, Paul D.

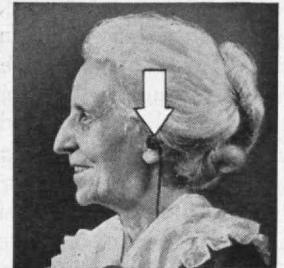
Sheeline, '19, Cleon R. Johnson, '11, C. Frank Allen, '72, and Harold B. Richmond, '14. One point made by Professor Allen was that once or twice a year there might be an informal gathering of the Boston alumni in the form of a smoker, buffet supper, and more general sociability than can be had at a formal alumni dinner. The general feeling was that a marked improvement could be made and that good ideas could be evolved. The discussion closed with the announcement by the President that the Executive Committee had voted that the President appoint a committee to study this matter and report.

Having disposed of the foregoing business, the speaker of the evening, Edward Robinson Schwarz, S.B., '23, Assistant Professor of Textile Technology at M. I. T. and Fellow of the British Textile Institute, was gracefully introduced by Dr. Rowe, and spoke on the subject announced in the call of the meeting, "Apparent

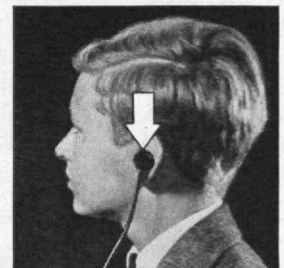
Paradoxes in Textile Testing." This talk was illustrated by a wealth of slides, many of them colored. All agreed that Professor Schwarz had made a revelation of one line of research at Technology which had not been at all appreciated by any of those present. The speaker's text paraphrased was, "There is nothing new under the sun," and he cited many paradoxes to prove his point. Although perhaps it is true that there is nothing new, nevertheless, with the development of the very latest type of microscopes, including polarizing microscopes, and the use of x-rays, knowledge is being gained of the structure and properties of all kinds of textile fibers, so that the industry is being put on a scientific basis.



"Heard you the first time"



"In touch with people again"



"Keeps me up with my class"



"Helps me in business"

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MACHINERY AND UNEMPLOYMENT

(Continued from page 210)

proportion in agriculture, forestry, and fishing pursuits fell off tremendously, although the total number of individuals so employed was rather stable, with an increase of but five per cent in the 20 years ending with 1920 and a decrease of substantially equal proportion in the following decade. The proportion in manufacturing, mechanical pursuits, and mining has remained remarkably stable, being 25.6% in 1880, 29.1% in 1900, 33% in 1920, and 30.9% in 1930. As population grew and invention contributed, the numbers of individuals employed in this group and their production enlarged notably, with an associated notable increase in trade, transportation, and clerical work. The percentage as well as numbers of individuals gainfully occupied in trade, transportation, and clerical work expanded tremendously. Those in professional employments also increased both in numbers and proportions. Similar shifts have occurred in western Europe. The bases of the figures may be criticized as subject to considerable error, but the figures are indicative nevertheless. There is no adequate reason to believe that further inventions and adaptation of machinery will notably change the trends of such figures.

It is percentages that we must here consider. The aggregate of hardships which may be caused by unemployment is a function of the number of individuals involved, and five million individuals unemployed

manifestly suffer more aggregate of hardships than 500,000 unemployed under comparatively like conditions. The specific magnitude of the problem thus depends on the number of individuals, but when we seek for causes and remedies, percentages and comparative numbers (in which 5,000,000 bears the same relation to 100,000,000 as 500,000 does to 10,000,000) are the significant relationships.

The various types of shifts of employment go on and will continue to go on as the trend of discovery and invention continues, even though the changes are associated with further reduction of hours in normal employee working-weeks. In some instances it is easy to readjust the employment of most individuals, but in other instances it is not easy. Employees of the more advanced ages and least mental skill are likely to be permanently displaced by such shifts. This emphasizes the importance in primary and secondary education of arousing in each individual an ability of adaptation which may enable transfers to be made from one occupation or one industry to another with the least delay or loss of effectiveness. The educated or brilliant man who is destitute through no fault of his own is a menace to organized society. The uneducated and meager-minded man who is destitute is a continuing cost-burden to society; and it is a poor order of intellect which can look upon the poorhouse as a desirable haven for old age.

The only civilized cure is to prevent these changes that are caused by invention and the use of machinery from causing destitution. This may be done by placing

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responsibility for farsighted provision on those commercial, industrial, or other profit-making activities favorably affected by the changes. Replacement of man-hours by machine-hours usually should be restrained unless the replacement enlarges net earnings sufficiently to provide a reasonable contribution for reestablishing the displaced employees' status of living. Applying these principles would of itself introduce a restraint upon the improper or socially unprofitable introduction of machinery.

The cost of redistributing or readjusting into new occupation employees who have been discharged from an industry because improvements of machines or methods have so increased production per employee-hour that those employees are no longer needed is logically as much a cost of the industry involved as is compensation of employees for accidental injuries. This employers' liability for accident compensation is now generally accepted as belonging to the several industries in accordance with their proportionate shares of such misfortunes, and such costs are now borne by the individual industries through insurance or equivalent alternatives under state regulations. This is enlightened sociology and its example will be followed in the needed provisions for readjustment and redistribution of employees.

It is necessary for us to use economy of means in adapting our ways to the new functions, and this will impel us to processes which the fathers of political economy could not consider orthodox. We need an exacting reexamination of the bases of political econ-

omy and an authoritative restatement of its theory based on such reexamination made in the light of the present status of science and invention and for the purpose of pointing the way to making that status still more contributory to human welfare. The influence of machinery on shifts in employment of the gainfully employed is a continuous force as long as scientific discovery and invention are prosecuted and it is not a cyclic force. It must be so recognized. Causes of depressions may include the effects of bad judgment in overbuilding and over-manning factories and of over-stocking inventories which may result from over-sanguine sales management, but the use of machinery *per se* bears no evidence of being a cause. In spite of the large expansion in the use of automatic and semi-automatic machines during the last 50 years, it seems safely established, at least for this country, that average actual wages earned per man have increased and average hours of work per week required for securing the earnings have decreased in industry and commerce, if we exclude depression and seasonal conditions as well as effects that are definitely pertaining to the aftermath of war. The manner in which we have expanded the corporation idea is one of our difficulties.

The expansion of the corporation idea, wherein there appears an extensive pooling of individual resources associated with closely limited financial and personal liability, and the widespread application of this idea in industry, has more directly and more drastically affected production, the character of employment, and the stability of employment than (*Continued on page 226*)

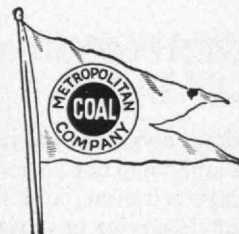
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MACHINERY AND UNEMPLOYMENT

(Continued from page 225)

the introduction of machinery alone could accomplish. Some of the effect has been good and some not so good, and the field is open for scrutiny, criticism, and improvement. Aside from this, great disservice has arisen from extravagant local governments. It may give a mental shock to some to be informed that machinery and invention used in mechanized industry have not been the prime devils in our present tragedy of unemployment. The popular allegations regarding machinery, over-production, and technological unemployment have been reiterated so often that many people accept their accuracy without analysis. It is important for us to recognize that there are other things playing a part in producing the evils and that the evils of machinery are not the greater influence, but are details from which study and experience will make it practicable to eradicate the abuses. Protection of every individual against such abuses is a primary point in sociology.

It is my impression that the foremost economists concur in the view that a return to muscle-strained hand labor would not prevent cyclical pulsations in industrial activity or prevent business depressions with their sad accompaniment of unemployment such as we now feel in such acute form. As previously noted the influence of invention and machinery is continuous

instead of cyclical. Contributing influences to cause depressions, such as over-lending of money, over-speculating of various natures, over-building and over-manning of factories in certain industries to supply an artificial and temporary market, over-planting of poorly productive land, over-rapid rise of the amount of manufactured product which is purchasable for the wage of an hour of factory work, ill-advised industrial and commercial mergers, dependence on borrowed money for expenditures that should be made only with owned money, exhausting and discouraging the desirable results of good judgment by stretching them into a dangerously thin veneer to camouflage and hide the results of bad judgment, and so on are all results of bad human judgment which has no direct relation to invention and machinery. It is scarcely reasonable to charge the latter with the effects of the former.

Here, in our occidental civilization, invention and machinery, as I have pointed out, have added immeasurably to the comfort and happiness of ourselves and our fellow citizens, and apparently to the improved character and general stability of our employment. We cannot truthfully ascribe the cause of cyclic unemployment such as that of today to invention and machinery. Appreciative recognition in our minds of the comprehensive and beneficial character of the major movement of the machine age will make us better armed to examine sharply the details (*Concluded on page 227*)

of hardships and abuses which have come in the wake of the movement and to even more promptly discover means for abating the hardships and abuses. Restraints, and some improvements of coupling (to use an electrical engineer's term), need to be introduced into our structure. It is necessary for us to devise means to accomplish this end, but it is a pity to hysterically condemn a great humanistic movement as a whole because of faults in its details.

BIOCRACY

(Concluded from page 206)

of wage reserves which could be used in times of temporary unemployment, power to arrange emergency employment or training for new types of labor skill, and power to accelerate or retard routine processes of production and distribution according to desirable adaptations to disturbing factors. In the bodily organism such powers are exercised not by the superior parts of the brain where adaptive intelligence is mediated, but by lower centers which work in an automatic manner when appropriate signals call them into action.

Stabilization of the essential processes of the body has, as a supreme result, the liberation of those activities of the brain associated with conscious life, activities which adapt the organism to new situations. Because of assurance of constancy in the fluid matrix, we are freed from paying routine attention to the management of the details of our bare existence. These details are attended to by regulatory devices. Without these devices we should be in constant danger of catastrophe unless we were always on the alert to correct voluntarily what, in the ordinary course of events, is corrected automatically. With these devices, however, the fundamental bodily processes are kept steady. We, as individuals, are thus made free, free to enter into agreeable relations with our fellows, free to enjoy beautiful things, to explore and understand the wonders of the world about us, to develop new ideas and interests, and to work and play untrammelled by anxieties concerning our bodily affairs. The main service of social stabilization, as I see it, would be to support bodily stabilization by assuring the supply of fundamental needs. In that way social stabilization would help to release the highest activities of the brain for adventure and achievement.

If there were a movement among men for the application of biology to social problems, these would be some of the suggestions which might be offered. I do not look forward with hope, however, to a real "biocracy;" and "technocracy" also is not likely soon to have the influence which its promoters desire. For years to come the technocrats and the biocrats will "view with alarm" the events which occur about them. And it will be a long time, I fear, before they will be able to "point with pride" to the values of their suggestions. The technocrats and the biocrats must wait, because the democrats have the votes!

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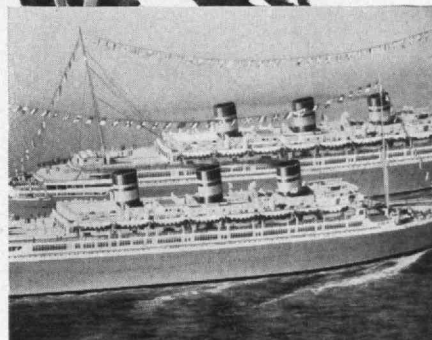
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MINING FROM THE AIR

(Continued from page 213)

At present, virtually all aviation activities in Canada are centered in the mining country, where the demand for quick transportation of men and materials provides brisk business for flyers. In striking contrast to mining rushes of the old days, when men raced by dog team or canoe to the scene of the discovery, reports of a strike now brings a fleet of swift airplanes filled with prospectors eager to drive their claim stakes as near as possible to the original discovery. Modern heated planes are flying this winter over the old trails of the Hudson's Bay Company's *voyageurs*, in a country which still furnishes a large proportion of the world's supply of furs, and which seems destined to become one of the most important mining districts in the world.

The Mackenzie River district, comprising the waterways north of Edmonton, Alberta, to the Arctic Ocean, once one of the most isolated regions of the Northwest Territories, now has regular airplane service. Before the coming of the airplane, dog teams were used in winter and canoes in summer to carry the mail from Edmonton to Aklavik on the Arctic Ocean, a distance of 1,800 miles. The journey, one of the most difficult in the North Country, required weeks of steady traveling, and often Arctic storms prolonged the time to months. In those days Aklavik got mail twice a year. Today the planes of the Canadian Airways fly the entire distance, with stops at various Hudson's Bay Company's posts, between dawn and darkness. The mail load for a dog train was 200 pounds. Last year planes carried 57,934 pounds of mail and approximately 200,000 pounds of freight into the Mackenzie River country.

The gold mines of central Manitoba, a promising field, were developed with the aid of air transportation. Recently a Canadian Airways plane left Winnipeg for the northern fields with 10 passengers and a cargo of freight valued at \$5,000. These big freighters of the air carry in supplies and bring out gold in the form of bullion.

What can be accomplished by airplane travel in the Canadian North was demonstrated recently when a Canadian Airways ship visited 13 mining camps and fur trading posts, a journey of several thousand miles, in less than a week. A winter and summer of arduous travel by dog team and canoe would have been required to cover the same territory a few years ago.

Activity in the mountainous mining country of British Columbia and the Yukon has increased in the past few years as a result of aerial exploration.

In the states of the Pacific Northwest, the Mamer Air Transport Company of which Newton Wakefield, '26, is Vice-President, has successfully used tri-motored planes not only for transporting prospectors but for maintaining contact with rangers of the forest service and in fighting forest fires. These ships take supplies to remote stations and are ready to fly men and fire-fighting equipment to the scene of a forest fire. The time saved in getting men into action has been an important factor in fire control over a wide area of rugged country in which transportation by land is slow.

(Continued on page 230)

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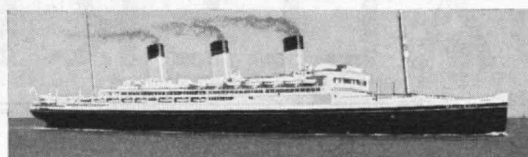
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MINING FROM THE AIR

(Continued from page 228)

Airplanes have also been employed in prospecting for oil and for the transportation of equipment in the petroleum fields of western United States and Mexico. The use of aircraft for exploration and prospecting and as a routine means of transportation in Central and South America has increased in the past few years.

RUSSIA, sprawling over parts of two continents between the Pacific Ocean and the Baltic Sea, is, like Canada, a country of great potential riches in natural resources. The Soviet Union, alert to the problems of transportation presented in a territory of such vast proportions and inaccessible character, has launched a program which, if carried to fulfillment, would cobweb the country with air transport lines. Already several are operating in the great hinterland of Siberia, where countless lakes and waterways offer ideal landing facilities in both summer and winter.

Distances between the various units of the Soviet Union are so great that it is a foregone conclusion that aircraft will have ample opportunity to prove their value for commercial and industrial transportation. They already have had an important part in the development of the timber and mining resources of Siberia. Their operations include aerial surveying, forest patrol, transportation of mining machinery and ore, fisheries development, whaling operations, and warfare on the

insect enemies of agriculture. During the past year, airplanes were successfully employed for sowing grain from the air, and experiments with smoke screens to protect crops from frosts were started this year.

In the length of her airlines, Russia with 25,000 miles ranks second to the United States, which now has nearly 30,000 miles of airways. Perhaps the most spectacular achievement in the development of air transportation in the Soviet Union in the past year was the opening of the Moscow — Novo-Sibirsk — Irkutsk line to Vladivostok, a distance of 6,200 miles. Several shorter lines were opened and numerous new flying fields, including several in northern Siberia and on the Arctic Ocean, were built.

The fact that eastern Siberia and Alaska are separated by only 60 miles of water, suggests interesting possibilities for aerial transportation and trading between the two countries when and if relationships between the United States and Russia permit serious consideration of such a project. The thriving towns of eastern Siberia, a land of furs and precious metals, are about the same distance from Moscow as from New York. From Nome, Alaska, across the Bering Straits to important Russian trade centers is a flight of only 500 miles. Vladivostok, terminus of the Trans-Siberian Railway, is only 3,000 miles from Alaska, but more than 6,000 miles from Moscow. From Nome to New York the distance is approximately 3,000 miles. These distances, not great for aircraft, have particular significance in the light of facts which show that the normal course of transportation for some products of this (Concluded on page 232)

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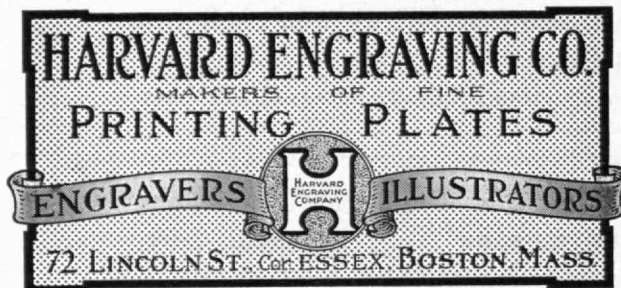
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MINING FROM THE AIR

(Concluded from page 230)

part of Russia is westward, either through Russia or by way of the Pacific to the European centers and thence to the United States.

Air transportation in Alaska has developed steadily in the past three years, and during 1932 the 31 planes operating there carried 6,637 passengers and 496,680 pounds of mail and freight. The Alaskan planes are used regularly by business men, traders, and prospectors, serving the country in summer and winter.

Airplanes are being widely used in Africa for freighting, passenger traffic, and exploration. In Morocco the French have carried out important explorations by air. While much has already been accomplished in Africa, the development of great areas still await the coming of the economic explorer, the geologist, and the mining engineer. The jungles of the interior and the great deserts of North Africa in particular are fields rich in opportunities for economic investigation by airplane.

In making use of aerial transportation in developing natural resources, the explorer and the engineer have contributed much to the progress of commercial aviation. In demanding a transportation system by air capable of meeting the strenuous conditions of exploration and in the freighting of heavy cargoes, the engineer has encouraged the development of aircraft for reliable service in new fields of usefulness.



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OLIVER HEAVISIDE

(Continued from page 214)

through a voluminous correspondence. Dr. Behrend was one of these friends, and it was through his influence that Heaviside was prevailed upon to accept honorary membership in the American Institute of Electrical Engineers in 1918. From one of the letters exhibited we learn that the first proposal of the honor met with this characteristic rebuff:

I think honors have been very much overdone; the more honors, the less value. It is depreciating the currency, and I hope the U. S. A. will not be led to imitating Britain in this respect. As regards scientific honors, I think that if a scientific man has received one or two good honors to "recognize" him, nothing useful is gained by their multiplication, and the effect may even be the other way. And yet it is very unpleasant to refuse them.

It makes me wish I had stopped at the tail F.R.S., with perhaps a good Honorary Ph.D. to balance the tail, by giving one the title of Doctor. For there are doctors in nearly every street (or there would be but for the war, which has improved the public health and lowered the death rate), and so people do attach some sort of consequence to the title, whilst F.R.S. means nothing at all, being less than F.R.H.S., to which our respected gardening townsman belongs by paying a guinea. Of late years there has been a perfect flood of new honors, and even the women have caught the plague . . .

If I were offered a Dukedom I might take it, having already an estate properly mortgaged up to its full capacity; and I should think I was doing the tribe of Dukes an honor by joining it; besides that, in private, I should derive great amusement from the transaction, and eat my rations with more zest.

Dr. Behrend persevering, however, there was a graceful capitulation, and in the end Heaviside declares:

I do not change my opinions about the multiplication of "honors" in the least. But you are evidently so sincere and well wishing yourself in the matter that I am obliged to withdraw all objection and do myself the honor of accepting your proposition, and of those who may think with you . . . Your letter is my justification.

With real feeling he rejects the suggestion that he had been forgotten, averring with warmth,

Hardly that. I have had some of the best friends a man could have, — Fitzgerald, Rayleigh, Kelvin, Hertz, and others. The first named was a noble soul indeed.

The honorary degree from Göttingen, awarded in 1905 "under the auspices and by the authority of the most puissant and august prince and lord Wilhelm II," had long since provided the desired "balance" to the Royal Society's fellowship which Heaviside mentions as the *tail* of his honors. But it was ever his way to scoff at ceremoniousness, and he one day enclosed the documentary evidence of this degree in an envelope addressed to Dr. Behrend with the superscription:

"If undelivered, please return to
Kaiser Bill, care of Dr. Heaviside
Duke of Homefield
Torquay, England."

It may well be believed, however, that this continental recognition of his attainments brought with it no small satisfaction. The felicitous phrasing, translated from the Latin reads:

That Eminent Man

OLIVER HEAVISIDE

An Englishman by Nation, Dwelling at Newton Abbot

Learned in the Artifices of Analysis

Investigator of the Corpuscles which are Wont to be Called
Electrons

Perservering, Fertile, Happy though Given to a Solitary Life
Nevertheless among the Propagators of the Maxwellian
Science Easily the First.

"Kaiser Bill" became later a favorite by-word with him, and one of his war-time letters closes with the sardonic statement:

"For information of Censor. Kaiser Bill is one of the best friends we have ever had, because he is waking us up."

In a similar way would he seek to personify his grievances and discomforts. Thus he "was poisoned by some of [Woodrow] Wilson's Chicago bacon," and complains, "Owing to Wilson's coming into the War so late, things have been very bad here both as regards food and fuel."

It is well known that Heaviside enjoyed the coining of new words to express his concepts with complete satisfaction. He seems to have played with the idea of associating his name with the loading of lines by a new term for this application of his great invention, remarking: "You do not take notice of my *Heavify*, *Heavification* idea — perhaps you thought it only a joke." This alludes to a previous letter to Dr. Behrend in which he proposed semi-seriously:

Nomenclature. A committee might settle that. Heavy and loading are closely connected. It was preordained. Like my experiments with knotted clothes lines and other things, shot, stones, and so on, done in the back yard at the age of 12 to 13. They sank in, tho' I had no notion of any application then. The *side* should be omitted. I never suffered much from it; they said it was swelled head. *Heavify* and *Heavification* seem to me the best.

In a post-script to this same letter the following incident is reported with evident relish:

A friend of mine now working at the Aircraft Factory at Farnboro told me a funny story about his visit to the U. S. some years ago. He had mentioned me, and received this startling information: "Heaviside? Is he still living? I thought he was one of the classics!" Now that is real fame, isn't it? And I may live 20 years more if I can keep out the rheumatism and damp cold which is the plague of England, and have the pleasure of hearing such remarks again . . . So you see there are compensations. I dare say I am better known as a classic in the U. S. than in Britain.

In an institution where Heaviside is well recognized as "one of the classics" in electrical engineering, it is particularly appropriate to bring his work to the attention of present-day students through this library exhibit. It is likewise a privilege to see a great scientist thus revealing himself frankly — and how entertainingly! — in a friendship that does equal honor to the writer and the recipient of these interesting letters.

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M. I. T. NEWS BULLETIN

PREPARED BY JOHN J. ROWLANDS, DIRECTOR, INSTITUTE NEWS SERVICE

Bringing the Tides Indoors

The tides of the Atlantic Ocean have been brought into a laboratory of the Institute, where they now ebb and flow at the will of engineers for study of their behavior in a model of the Cape Cod Canal. The object of this research, now in progress in the River Hydraulic Laboratory, is to determine the effect of a proposed lock to stop the swift tidal currents which now make navigation in the waterway difficult.

Some idea of the complex problems presented in this investigation is indicated in the fact that the average rise and fall of the tide in Cape Cod Bay, a sea level waterway, is five feet greater than in Buzzards Bay. There is also a tide time difference of three hours between the bays. As a result, the tide in Buzzards Bay is rising while the sea is still falling in Cape Cod Bay, and the tide in Buzzards Bay begins to ebb several hours before high water at the opposite end of the canal.

Under extraordinary conditions of flood tide driven by high winds, maximum differences in level of nine feet between the bays may occur. At high tide in Cape Cod Bay the water is rushing southward to the lower level in Buzzards Bay. Six hours later the current reverses and flows swiftly northward. The maximum velocity of these currents under ordinary conditions is more than three miles an hour, while during storms the velocity may reach nearly five miles an hour.

These currents greatly complicate navigation in the canal, making it difficult to control vessels and causing long delays. Many captains of large ships avoid the canal because of the risk of being driven ashore. Under plans recently completed, the canal, now owned by the government, will be widened to 250 feet and dredged to a maximum depth of 30 feet, and a lock to control the tidal currents is expected to make the waterway safe for all vessels.

In the miniature scale model in the River Hydraulic Laboratory at Technology, the operation of the canal under control of a lock is expected to be accurately determined in advance. This undertaking represents the most advanced practice in modern hydraulic research in which problems are studied in miniature and the results transferred to the full natural size. The research is being carried on by Professor Kenneth C. Reynolds '25 and John B. Drisko '27, Instructor and member of the Research Staff.

The Cape Cod Canal, as it exists, is a one-way waterway 100 feet wide and 25 feet deep, with a total land length

of approximately seven and one-half miles between Cape Cod Bay and Buzzards Bay. The laboratory model of the canal was built to a scale of approximately five and one-half feet to one mile, with a length of $41\frac{1}{2}$ feet.

It is constructed of concrete blocks, which form a channel accurately reproducing the curving path of the canal across the Cape. In a tank, which in the model represents Buzzards Bay, are scientific devices which accurately reproduce in miniature the ebb and flow of the tides. Various floats arranged along the canal record the effect of currents and wave motion.

Although its motion is imperceptible to the eye, the rise and fall of the tide is actually the motion of a gigantic wave. In their studies in the model canal Professor Reynolds and Mr. Drisko are able to produce waves ranging from slight ripples to the full surge of the tide with its powerful currents. Delicate instruments chart the effects of these waves in the canal, supplying the data for calculations.

In this work, time as well as physical proportions has been reduced. As a result, the complete cycle of the rise and fall of the tide, which in nature requires approximately 12 hours, may be reproduced in miniature scale within a few moments. The study, which will include innumerable observations under varying conditions, is expected to require several months.

Open House in May

After a year's interim, Open House will again take its place as a significant day on Technology's spring calendar. May 6 has been chosen as the date upon which the Institute will be open for inspection by the public.

The proposal to hold a 1933 Open House was sanctioned by the Faculty, and arrangements, as in the past, are in charge of the Combined Student Professional Societies.

An annual event for nine years previous to 1932, Open House was omitted last spring following the Faculty's decision that the effectiveness of the event might best be maintained by holding it less often. The forthcoming occasion will thus be the tenth time that the Institute has invited the general public to inspect its equipment and buildings, witness various student activities, and see demonstrations of important new scientific and engineering developments.

The popularity of the affair was strikingly illustrated at the last Open House in 1931, when more than 30,000 people visited the Institute.

Appointed

Announcement was recently made of the assignment of Captain Bayard Johnson of the Army Air Corps to duty with the Reserve Officers Training Corps at the Institute. Captain Johnson will fill the vacancy created by the death last December of Captain Louis R. Knight.

A native of Michigan, Captain Johnson was commissioned in the Army Air Corps in 1918, after service in the ranks. He is a graduate of the Air Corps Engineering School, and is a rated pilot and observer. He was formerly on duty at Wright Field, Dayton, Ohio.

To Honor Dr. Thomson

Preliminary plans for a dinner on March 29, at which leaders in science, engineering, and industry will honor Dr. Elihu Thomson, the distinguished engineer and inventor, upon the occasion of his 80th birthday, have been announced.

The dinner is to be held at the Institute, of which Dr. Thomson was Acting President from 1920 to 1922, and of which he is now a Life Member of the Corporation.

International in its significance, the dinner will bring together distinguished representatives of the electrical industry to which Dr. Thomson has made so many important contributions, leaders from educational institutions, and officers of the various professional societies and technical organizations.

Preliminary plans for the tribute to Dr. Thomson provide for an afternoon meeting for the presentation of papers significant to the occasion. These would include discussion of the historical development of the applications of electricity, the recent experimental trends, and modern electrical theories.

In connection with this meeting, plans are being made for an impressive exhibit of many of Dr. Thomson's inventions and contributions in the electrical field.

The Committee in charge of arrangements consists of Professor Dugald C. Jackson, Head of the Department of Electrical Engineering at the Institute, Chairman; Professor Gustav C. Dahl, Secretary; Dr. Charles G. Abbot, Secretary of the Smithsonian Institution; Dr. James R. Angell, President of Yale University; Dr. William W. Campbell, Director of Lick Observatory and President of the National Academy of Science; Mr. Harry P. Charlesworth '05, Vice-President of the Bell Telephone Laboratories, Inc., and President of the American Institute of Electrical Engineers; Dr. Karl T. Compton; Dr. Harvey W. Cushing; Mr. Nelson J. Darling, Manager,

River Works, General Electric Company; Mr. Alexander Dow, President of the Detroit Edison Company; Dr. Paul D. Foote, Director, Research Laboratory of Gulf Production and Pipe Line Companies; Hon. William C. Forbes; Professor Jeremiah D. M. Ford of Harvard University, and President of the American Academy of Arts and Sciences; Dr. Thomas S. Gates, President of the University of Pennsylvania; Dr. George E. Hale '90, Director of Mt. Wilson Observatory; Mr. Nathan Hayward '97, President of the American Dredging Company; Dr. Frank B. Jewett '03, Vice-President of the American Telephone and Telegraph Company; Dr. Arthur E. Kennelly, President, Union Radio Scientifique Internationale; Mr. John C. Lincoln, Chairman, Board of Directors, the Lincoln Electric Company; Dr. Arthur D. Little '85, President, Arthur D. Little, Inc.; Dr. A. Lawrence Lowell, President of Harvard University; Dr. Roland S. Morris, President of the American Philosophical Society; Dr. Calvin W. Rice '90, Secretary, American Society of Mechanical Engineers; Mr. E. Wilbur Rice, Jr., Honorary Chairman of the Board, General Electric Company; Mr. Andrew W. Robertson, Chairman of the Board, Westinghouse Electric and Manufacturing Company; Mr. Albert L. Rohrer, formerly of the General Electric Company; Mr. Clayton H. Sharp, Vice-President and Technical Adviser, Electrical Testing Laboratories, and Chairman of the U. S. National Committee of the International Electrotechnical Commission; Mr. Ambrose Swasey, Chairman of the Board, Warner and Swasey Company; Mr. Gerard Swope '95, President of the General Electric Company; and Mr. Edwin S. Webster '88, President, Stone and Webster, Inc.

Professor Schwarz Honored

For notable contributions in the field of textile technology and research, Professor Edward R. Schwarz '23 of the Department of Mechanical Engineering has been elected to a fellowship in the British Textile Institute.

In granting this distinguished fellowship, the British Institute took cognizance not only of Professor Schwarz's independent studies, but also of his standing as a graduate of Technology and a member of its Faculty, of the large number of original papers he has contributed to textile publications, and specifically, of the recent acceptance by the *Journal* of the Textile Institute of an article on the microanalysis of yarn structure.

A charter member of the United States Institute for Textile Research under the presidency of the late Dr. Samuel W. Stratton, Professor Schwarz is at present chairman of that organization's committee on bibliography and abstracts, as well as chairman of its board of editors. In the latter capacity, he supervised the preparation of "Textile Research—A Survey of Progress," the first volume published by the Technology Press.

He is also director of editorial policies for *Textile Research*, monthly publication

of the Institute for Textile Research, and is a member of the Advisory Committee of the Textile Foundation, of which Dr. Karl T. Compton is chairman.

Under the personal direction of Professor Schwarz, Technology has developed since 1925 one of the best equipped textile microscopy laboratories in this country, and possibly in the world. The work in this laboratory was initially devoted to acquiring proper equipment and technique for textile study, but emphasis is now being placed on their application to both fundamental and practical research.

Coordinated with the work of the textile testing and microscopy laboratories at the Institute are the studies being undertaken in the Department of Biology and Public Health on the effects of bacteria and molds on textile fibers. The Department of Physics has also made important contributions in the field of optics and color measurements, and in fiber analysis by means of x-rays, while the Department of Chemistry is carrying on interesting research in colloids, dye structures, and the application of polarized light.

Death of Miss M. R. Miller

Miss Mabel R. Miller, who for 26 years was a member of the secretarial staff of the Institute, died suddenly on February 6.

Miss Miller came to Technology in 1907 as secretary to Mr. Walter Humphreys, then Secretary of the Alumni Association. In 1911 she became secretary to the late President Richard C. Maclaurin. During the years when the late Mr. George Eastman made his gifts to the Institute under the pseudonym of "Mr. Smith," Miss Miller alone shared with Dr. and Mrs. Maclaurin the knowledge of the real identity of Technology's greatest benefactor. Dr. Maclaurin later in an address before an Alumni group paid tribute to Miss Miller's discretion during that time when every attempt was made to discover the secret.

Miss Miller also was secretary to the President during the administration of the late Dr. Stratton, and since his death she had been in charge of the Corporation records and served as secretary to Vice-President Vannevar Bush '16.

The Value of Good English

The importance of training in correct and forceful English for the student of science and engineering was emphasized in the recent meeting of the Advisory and Visiting Committees of the Departments of English and Modern Languages. The meeting was attended by a distinguished group of engineers and business leaders who discussed various aspects of the subject, stressing particularly the professional benefits and the cultural satisfaction of a knowledge of the best in literature. The importance of personality in teachers of English and the need for wide reading were also topics of discussion.

General R. I. Rees, Vice-President in charge of Personnel for the American Telephone and Telegraph Company, reported significant results of the study of methods of teaching English which he made for the Society for the Promotion of Engineering Education. The interest of employers in the ability of their staff to use English effectively was indicated by several speakers who reported the experience of their personnel officers.

The presiding officer at the meeting was the Hon. W. Cameron Forbes, former United States ambassador to Japan and Governor-General of the Philippine Islands. Members of the group included General W. D. Connor, Superintendent of the United States Military Academy at West Point; Dr. Arthur D. Little '85; Mr. W. K. Richardson of the law firm of Fish, Richardson and Neave; Mr. Matt Jones, President of the New England Telephone and Telegraph Company; Dr. Payson Smith, Massachusetts Commissioner of Education; and Mr. Francis J. Chesterman '05, General Manager of the Bell Telephone Company of Pennsylvania.

Representing the Institute staff were President Compton, Dean Bush, Dean Prescott '94, Professor Henry G. Pearson, Head of the Department of English and History, and members of his staff; Professor Ernest F. Langley, Head of the Department of Modern Languages; and Professor William P. Ryan '18, Head of the Department of Chemical Engineering.

The Bursar's Bank for Students

Approximately \$50,000 belonging to students, faculty members, and various activity groups at Technology is now on deposit in the Institute, according to Bursar Horace S. Ford. One of the most valuable services rendered to Technology men by the Institute administration, the bank permits deposits of money for withdrawal in person at any time. No interest is paid on deposits.

The present total of \$50,000 represents nearly the maximum ever deposited, while in the summer the amount drops to about \$15,000. Of the 750 depositors, some 530 are students, the other accounts belonging to members of the faculty and undergraduate activities. This banking service of the Bursar's office is one of the numerous ways in which the Institute provides for the welfare and convenience of members of its staff and students.

Notes from the President's Office

Mid-winter activities of President Compton included a radio address on "Unemployment Reserves" delivered under the auspices of the New England Council, in which he discussed the findings of a recent state commission.

The following week, Dr. Compton attended a meeting of the American Philosophical Society in Philadelphia, and on January 26 and 27 was present at sessions of the American Institute of Electrical Engineers in New York City.

Vice-President Bush returned recently from a brief vacation in Miami, Fla.

ADVERSARIA

Congratulations

¶ To FRANCIS R. HART '89, on his election to the Presidency of the United Fruit Company. Mr. Hart joined the company after spending a number of years in tropical countries engaged in engineering following his graduation from M. I. T. He then went to Colombia as manager of the Cartagena-Magdalena Railway. Since 1901 Mr. Hart has been a director and member of the Executive Committee and he has also been Chairman of the Finance Committee of the United Fruit Company. He has been vice-chairman of directors of the Old Colony Trust Company of Boston since 1908. (See class notes for complete account.)

¶ To ELISHA LEE '92, Vice-President of the Pennsylvania Railroad, on his election as director of the Western Union Telegraph Company.

¶ To FRANK P. McKIBBEN '94, on being awarded the Samuel Wylie Miller medal for meritorious achievement which "has contributed conspicuously to the advancement of the art" (of welding), at the October meeting of the American Welding Society held in Buffalo. For 32 years in the teaching profession (13 years at M. I. T., 12 years at Lehigh University, and seven years at Union College), Professor McKibben has also been occupied with consulting work, and in recent years has been active in the development of structural welding in his position as consulting engineer for the General Electric Company.

¶ To JAMES REED '06, former naval construction officer and management expert, on being selected general manager of the Golden Gate Bridge and Highway District by the Board of Directors. Mr. Reed retired from the Navy in 1920 with the rank of commander and entered private engineering and management practice. In 1925 he became works manager for the Celite Company at their mining and chemical plant at Lompoc, resigning in 1929 to become general manager of the Schlage Lock Company.

¶ To ROBERT E. WILSON '16, on his appointment to the newly created position of Vice-President in charge of research of the Standard Oil Company of Indiana. Mr. Wilson graduated from the College of Wooster in Ohio, before receiving his degree from the Institute. Serving during the War as major in the Chemical Warfare Service, he returned to the Institute as Professor of chemical engineering in 1919 to direct the activities of the Research Laboratory of Applied Chemistry. In 1922 he joined the research staff of the Standard Oil Company of Indiana and in 1927 was appointed assistant to the Vice-President in charge of manufacturing and given charge of the Patent and Development Department. Mr. Wilson's election to the Board of Directors in 1931 and his

current elevation to Vice-President mark recognition of his work and of the importance of research to the company.

¶ To ROYAL B. WILLS '18, on being awarded the gold medal in the small house architectural competition for 1932, sponsored by Better Homes of America, by President Hoover on February 15.

¶ To WYMAN P. BOYNTON '31, on election to the New Hampshire Legislature.

¶ To ARTHUR E. KENNELLY, emeritus Professor of electrical engineering at the Institute, on his election to the Presidency of the International Scientific Radio Union (U. R. S. I.).

Engineering's Wider Outlook

¶ That engineers are dull technical men, uninterested in social movements and the human side of industry, has become almost a bromide in the conversation of the uninformed. Convincing refutation was given by the recent meeting of the Taylor Society, an organization devoted to management and personnel problems. The President of the Society, SANFORD E. THOMPSON '88, spoke and presided at the meetings at which DONALD R. STEVENS '11, Vice-President of the Okonite Company; HAROLD V. O. COES '06, of Ford, Bacon and Davis, Inc.; EDWIN D. MARTIN '22, Vice-President and General Manager of the Emark Battery Corporation; and Professor HUDSON B. HASTINGS '07, of Yale University, all spoke. The subjects discussed by these Technology Alumni furnished an excellent demonstration of what Professor Edwin R. A. Seligman has noted (in *The Tech Engineering News*) as "a decided tendency in recent years to enlarge the scope and content of engineering and to have it include not only the formulation of principles and the design of mechanisms, but also the system of group conduct for the benefit of man. . . . Modern engineering is becoming more and more conscious of these wider problems and beginning to assume some responsibility for the proper social use of the mechanisms which it calls into existence. The great engineer of the future is he who will not only have a mastery of technique but also possess an appreciation of, and an acquaintance with, the wider social implications of what he is endeavoring to create. When engineering and economics join hands, we may hope for that more ideal consummation of achieving not only greater wealth in its material aspects, but also greater welfare in its broadest aspects for the community as a whole."

Engineering Society Presidents

¶ Impressive is the list of presidencies of engineering societies filled by Technology alumni. At the turn of the year the following Technology men were either

retiring from or assuming the presidencies of the following societies:

¶ *American Institute of Electrical Engineers* — HARRY P. CHARLESWORTH '05

¶ *American Chemical Society* — ARTHUR B. LAMB '02

¶ *Illuminating Engineering Society* — JOSEPH W. BARKER '16

¶ *National Safety Council* — JAMES I. BANASH '06

¶ *Society for the Promotion of Engineering Education* — ROY A. SEATON '11

¶ *American Welding Society* — FRANK P. McKIBBEN '94

¶ *Canadian Mining Institute* — JOHN A. ALLAN '12

¶ *Taylor Society* — SANFORD E. THOMPSON '88

¶ *American Electrochemical Society* — BRADLEY STOUGHTON '96

¶ *Manufacturing Chemists Association* — LAMMOT DU PONT '01

¶ *American Society of Mechanical Engineers* — ANDREY A. POTTER '03

¶ *American Institute of Steel Construction* — CHARLES N. FITTS '91

¶ *American Society of Civil Engineers* — ALONZO J. HAMMOND '91, official nominee for 1933 (See class notes for account.)

Deaths

¶ JOSEPH W. REVERE '68, on December 13. (Account in February class notes.)

¶ FRANK H. PIERCE '75, on January 8. (Account in class notes.)

¶ WILLIAM R. WEBSTER '75, in January.

¶ WILLIAM W. JACQUES '76, on June 24. (Account in February class notes.)

¶ ARTHUR L. MILLS '76, on December 13.

¶ CHARLES L. RICH '76, on January 11. (Account in class notes.)

¶ THOMAS F. STIMPSON '77, on December 27. (Account in class notes.)

¶ CHARLES S. BACHELDER '77, on July 18.

¶ GEORGE H. MONKS '77, on January 26. (Account in class notes.)

¶ CHARLES S. GOODING '79, on December 24.

¶ WILLIAM T. KEOUGH '88, on January 20.

¶ DELIA STICKNEY '89, on January 2. (Account in class notes.)

¶ CLARENCE E. WHITNEY '91, on January 22. (Account in class notes.)

¶ BENJAMIN M. MITCHELL '93, on October 8.

¶ JOHN E. CARTY '97, on February 5.

¶ WALTER S. CRAVEN '03, on January 6.

¶ EDWIN T. WOOD '04, summer of 1932.

¶ JAMES S. BELL, JR., '06, on December 15. (Account in February class notes.)

¶ BERTRAM A. THOMPSON '06, on July 31.

¶ GUY H. BUCHANAN '13, on January 21. (Account in class notes.)

¶ DOUGLAS W. NEFF '15, on May 23.

¶ CHARLES A. SMYTH '20, on January 27.

¶ JACOB DUNNELL '29, on December 18.

¶ JOHN R. BUXTON '29, on December 22. (Account in class notes.)

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Kentucky

The Club had a very excellent meeting on December 29 at the Brown Hotel, the meeting being jointly sponsored by the local section of the A.S.M.E., of which Dean Potter '03 is President, by the Alumni Club of Purdue University, of which he is an officer, and by the M. I. T. Alumni group, of which he is a fellow member. Dean Potter's address at this meeting is given in part below as described by the newspapers. We had an attendance of between 60 and 75 and felt that the meeting was very stimulating to those who attended. In "The Engineer's Role in the Recovery" Dean Potter said, "The best country in Europe at its best is worse than this country at its worst." He explained that he had spent 15 years in Europe.

Asking for "courage and an absolute faith in our country and in humanity," Dean Potter struck at the mode of defeatism and the "cult growing up which favors resignation to present conditions." Granting that at present our particular system does not seem to be working as well as it should, the speaker asked whether the only solution should be the theory that what won't work should be thrown away. "Personally, I don't agree with the technocrats," he said. "One trouble is that they deal in statistics and they have absolutely no control over their surroundings."

One real danger is the present orgy of economy and hysteria for lower taxes. There are 30,000,000 children in schools of this country, from kindergarten to colleges, and the cost is less than 12¢ per capita of the voting population. This is the equivalent of the cost of an ordinary cigar per day per capita. The education of the youth of this country cannot be postponed.

Citing character and ethical standards as the first purpose of education, he went on to say that it is our duty to inculcate it in the youth while he is susceptible to the call of high purpose. He disagreed with some critics of modern youth, saying that in his opinion youth was better than it ever was.

"In conclusion, let me assure you that we have no reason to despair either about the future of this country or about the opportunities ahead of our engineering profession. Temporarily there is an economic unbalance the world over, but American genius, which is responsible for more than two-thirds of the epoch-making inventions of the last 60 years, coupled with the good sense of our people not to be carried away by false doctrines, will result before long in more general well-being than ever before, and in this

recovery the engineer is bound to play a most prominent rôle," Dean Potter declared.

"It is being recognized that more than nine-tenths of the world's population have had little, if any, of the benefits of the scientific advance of the past century. Even in this most favored country our people at large are not too well fed or housed, do not wear particularly good clothes, and lack many of the other material comforts which are essential for well-being and happiness.

"It is true that throughout history the growth in human necessities has never kept pace with the increase in population, and wars or plagues were needed to balance consumption and production. However, engineering applied to production can make available sufficient of the world's goods for all, if the economic structure of society can be adjusted to provide sufficient purchasing power on the part of those who are able and willing to work." Dean Potter's address was inspiring and the above report is a very good cross-section of it. — JAMES R. HANCOCK '24, *Secretary*, McDonnell and Miller, 328 Breslin Building, Louisville, Ky.

New Haven County Technology Club

The winter dance of the New Haven County Technology Club was held on December 16 at Colonial Inn, West Haven, Conn. In spite of the zero weather, 14 couples enjoyed a very pleasant evening of dancing from nine until one, with refreshments being served at intermission. — MARSHALL S. WELLINGTON '16, *Secretary*, 60 Holcomb Street, West Haven, Conn.

The Technology Club of Rochester

On Saturday evening, January 14, members of the Club gathered at the University Club for their first dance of this season. An opportunity was provided before dinner for members and their wives and friends to meet one another. This was a happy occasion for all. A good dinner, a good crowd, and a good orchestra provided entertainment until it was time to go. Due to the success of this venture the Club scheduled a similar party for February.

Dr. Compton spoke at the meeting of the local section of the Optical Society of America on February 7. His subject, of particular interest to both members of the Club and the Optical Society, was "The George Eastman Spectroscopy Laboratory at M. I. T." Members of the Club were pleased to take advantage of the invitation extended to attend this meeting in a group. — LAURENCE T. TUFTS, '29, *Secretary*, Building 26, Kodak Park, Rochester, N. Y.

Technology Club of Shanghai

Our September meeting was held at the F. F. Club, 16 Burkill Road, on the 30th of September with 40 members present. As usual the meeting was preceded by a dinner banquet at which Messrs. T. Kao '15, Frank C. Ede '23, T. W. Chen '22, H. Y. Hsu '23, and I. C. Ko '27 were the hosts. Four tables were served.

The meeting was called to order by President Hopkins after dinner at nine o'clock. The question of our representative on the Alumni Council was discussed. It was generally agreed that we should have on the Council a man who knows China and it was decided that the Secretary should write to William L. C. Moy-Ding '20, 19 Harrison Avenue, Boston, asking him whether he would be willing to serve on the Council. At the same time we should write to the Alumni Association for the requirements of such a representative. The question of disposing of the remainder of our Gift Fund was discussed, but postponed until the next meeting.

Y. S. Tsao '27 gave us an inspiring talk recalling his old student days in Boston and telling us some of his experiences after he came back to China. In conclusion, Mr. Tsao urged all Technology men to show more interest in the political affairs of our country besides our regular business and technical activities. The meeting adjourned at 10:30 p.m.

The October meeting was held at the Medium Club, 150 Weihaiwei Road, on October 31, with Messrs. Kalgan Shih '22, P. N. Soo, Y. H. Li '22, and Z. Z. Li '22 as hosts.

Dinner began at 8:15 with 32 members present. The question of disposal of the remaining Gift Fund was brought up for discussion. It was decided that the Secretary should write to the Chinese Students Club at M. I. T., asking them to consider and approach Professor Locke as to what would be the best scheme of using the fund.

Messrs. Waken Chang '28, T. Wong '16, T. C. Shih '29, K. T. Lee '19, and C. H. Sung '17 volunteered to be the hosts for the November meeting. It was also suggested that we should have a party in December at the International Recreation Club. Those members who have not been hosts during the year will act as hosts for the party, which will be under the management of Y. H. Woo '23.

The November meeting of the Club was held at the New Chinese Y. M. C. A. building on Friday evening, November 25. Messrs. Waken Chang, T. Wong, T. C. Shih, K. T. Lee, and C. H. Sung acted as hosts. The meeting was called to order after the dinner at 9:00 p.m. An Election Committee was formed to take charge of the election of officers for the next year. Messrs. Paul H. Hsu, Y. H. Woo, and

T. F. Wei '20 were elected to the committee. It was decided that the usual stag party was preferred for the December meeting.

President Hopkins then introduced L. T. Chen, principal speaker for the evening. Mr. Chen gave a brief review regarding the foreign relations of China during the past decade and told us his viewpoint concerning the Lytton Enquiry Commission report. The meeting was adjourned at 10:30.

The December meeting was held at the Chinese Bankers' Club, 4 Hongkong Road, on Tuesday, December 20. Messrs Y. T. Sze '14, Y. H. Woo, T. C. Wang, W. Y. Chiu '18, Y. M. Ma '26, Y. T. Van '14, M. Chow '15, M. T. Hsu, and H. Y. Lo '26 acted as hosts. Elaborate dinners were prepared by our hosts and the 32 members sat at three tables. After the meeting was called to order by the President, election of officers for the next year then took place. Mr. Wei, representing the Nominating Committee, presented the candidates and the following were elected: T. K. Tse '08, President; M. C. Chan '26, Secretary-Treasurer; and H. C. Liu '23, Assistant Secretary-Treasurer. The meeting was concluded with a Stein Song and three cheers for the retiring officers. — L. C. KING '26, *Secretary*, Box 434, Shanghai, China.

Technology Club of Toledo

The members of the club assembled on December 13 and went over the financial report for 1931-1932, which was submitted by the Secretary, and a copy of this report was placed in the files.

A résumé of the wonderful trip to Cranbrook School, Birmingham, Mich., was given by Mr. Barnby and it was all agreed that any member of the club who did not make this trip last July when our President, Dr. Compton, addressed the Detroit Club, missed a very educational and enjoyable day. It was urged upon all members that if an occasion presents itself, they should not miss seeing this beautiful school.

Mr. Barnby discussed the plan for this year, whereby instead of trying to get speakers when our club is so small we should just have a short business session and spend the balance of the meeting in recreation, such as bowling. For that purpose the meeting adjourned at 8:30 to the Toledo Club, where those present rolled a few games. When the fire had subsided, Walter O. Teague '02 was the high man with an average of 161. This speaks very poorly for the rest of the club.

On January 10 all business was dispensed with and the club members engaged in a full evening of bowling. The pins started falling even before the President and Secretary of the club had arrived. — WILLIAM F. DONOVAN, JR., '24, *Secretary*, 305 Spitzer Building, Toledo, Ohio.

Washington Society of the M. I. T.

The 1932-33 season of the Washington Society of the M. I. T. opened at the University Club with the Luncheon Meeting

of Friday, October 21, 1932, at which Dr. Thomas A. Jagger, Director of the Kilauea Volcano Observatory and former Professor of Geology at the M. I. T., was the guest of honor and speaker of the occasion.

Dr. Jagger's subject, "Recent Developments in Vulcanology," proved of absorbing interest, particularly as he interspersed the serious side of his remarks, which dealt with the cycles of vulcanology, the natural laboratory region of Hawaii, and the practical results of vulcanology in developing forecasting of earth movements and knowledge of the character of the earth's sub-surface, with interesting personal experiences, and a thrilling description of the rescue of the bodies of two suicides from the crater of Kilauea by an ingenious Japanese engineer.

The Society was also pleased to have Mr. J. R. Bibbins as its guest, and the members present included: A. M. Holcombe '04, M. L. Sperry '00, Proctor L. Dougherty '97, H. W. Tyler '84, T. C. Atwood '97, A. L. Sherman '06, W. E. Lutz '17, A. E. Beitzell '28, C. B. Allen, Jr., '29, O. G. Green '30, F. L. Ahern '14, W. I. Swanton '93, E. D. Merrill '09, G. S. W. Bishee '32, L. J. Grayson '19, K. P. Armstrong '10, F. W. Swanton '90, William K. MacMahon '22, E. T. Steel '06, and the Secretary.

Jumping from sub-surface wonders to those more nearly on a level with the surface, the Society had, as its guest and speaker for the second meeting of the season on Friday, November 18, 1932, at the University Club, Mr. L. W. Barclay, Director of the National Parks Association, who explained, amid an avalanche of photographs, maps, and illustrations, the wonders of "The Proposed Everglades National Park," near the southwestern extremity of Florida. The Society was intensely interested to learn of the comparative inaccessibility of this region, the necessity for traversing it almost entirely by water, and the efforts that have been made to preserve its magnificent Royal Palms from the inroads of those who would transplant them to Miami and other centers, and its breeding-grounds for sea-going turtles and other fast disappearing fauna from the excessive slaughter practiced by Cuban and other fishing and hunting expeditions.

Upon completion of his formal talk, Mr. Barclay was delayed with questions by a number of the members. Those present included: W. I. Swanton '93, F. W. Swanton '90, F. W. Turnbull '29, A. F. Flournoy '23, A. M. Holcombe '04, John D. Fitch '24, William K. MacMahon '22, W. M. Corse '99, F. E. Matthes '95, A. B. McDaniel '01, H. W. Tyler '84, Kenneth P. Armstrong '10, M. C. Mason '12, Edward T. Steel '06, and the Secretary.

The third and Annual Election meeting was held at the University Club on Friday, December 16, and the following officers were elected: Dr. Harry W. Tyler, President; Frederic W. Southworth, Vice-President; Joseph Y. Houghton, Secretary; and C. H. Godbold, Treasurer.

The Society, having decided to maintain the Scholarship and Executive Committees and to establish a new Committee on Meetings to assist the President in arranging for speakers and programs, elected the following chairmen: Proctor L. Dougherty, Scholarship Committee, William Malcolm Corse, Executive Committee, and Amasa M. Holcombe, Meetings Committee.

Other members of these committees so far designated for 1933 are: Scholarship Committee, Amasa M. Holcombe, A. E. Hanson, K. P. Armstrong, Joseph Y. Houghton; Executive Committee, the officers, *ex officio*, Proctor L. Dougherty, Amasa M. Holcombe; Meetings Committee, Frederick A. Hunnewell, A. B. McDaniel, Proctor L. Dougherty.

Following the election of officers a very interesting talk on the "Administration of Indian Affairs" was delivered by Dr. W. Carlson Ryan, of the Indian Service, who explained how the service is gradually working itself out of a job, and made clear to the members that the average Indian in the same environment is no different from the average white man, no less clever, honest, or healthy, and no more lazy. Dr. Ryan intermixed with his remarks illustrations of many of the follies and foibles of the Indian Administration which have helped the Indian to either leave it to the "Great White Father" to take care of him, or to come to the conclusion that the "Great White Father" has less sense than he, as the case may be.

The Society was glad to welcome a number of new members from the Reconstruction Finance Corporation, and the membership present included: William K. MacMahon, Kenneth P. Armstrong '10, H. C. Morris '00, F. W. Swanton '90, Dwight Clark '97, F. A. Hunnewell, E. D. Merrill '09, O. G. Green '30, B. E. Sherrill '28, C. B. Allen, Jr., '29, Richard N. Chindblom '30, Francis G. Wells '22, J. W. Clary '96, W. C. Dean '00, Allen Pope '07, Hugh S. Wertz '31, A. L. Sherman '06, Harry C. Whitaker '09, F. C. Atwood '97, W. I. Swanton '93, George A. Ricker '86, William E. Lutz '18, Thomas M. Roberts, William E. Swift '95, John H. Gregory '95, G. V. Patrick '28, A. M. Holcombe '04, H. W. Tyler '84, Proctor L. Dougherty '97, A. E. Hanson '14, and the Secretary.

The special meeting for undergraduates, which is in the way of becoming an annual event of the Washington Society was held at the University Club on Friday, December 30, and in honor of the occasion, nearly the entire R.F.C. Contingent of the Society turned out to meet those present of our future alumni.

The program for the luncheon was in the hands of the newly created Committee on Meetings, with Mr. A. B. McDaniel, past President and fluent speaker, in the chair. The remainder of the Committee, however, seemed to feel that it should make itself heard, and repartee was fast and furious at times between the Master of Ceremonies, his right-hand man, Mr. Dougherty, his still more right-hand man, Mr. Holcombe, and the leader

of the "Old Guard" '90-'00 decade, Dr. J. H. Gregory '95, much to the amusement of the undergraduates attending. The Master of Ceremonies came off victorious, however, and maintained order by giving his chief heckler, Dr. Gregory, only three minutes in which to completely summarize the organization and functioning of the R.F.C., by giving Mr. Dougherty but two minutes to present the report of the Scholarship Committee, by appointing Mr. Holcombe cheer-leader, and by calling upon each of the scholarship men for the last three years (who were picked out as among the most hilarious) to give one-minute talks on their activities at the Institute.

Dr. Gregory's talk was so enlightening, notwithstanding his limitation as to time, that it was decided that the sample warranted a larger order, and the Secretary is glad to report that Dr. Gregory will be the speaker at the January meeting, for which reason any outline of his three-minute summary of what it took Congress three months talking to create will be omitted here.

The report of the Scholarship Committee that the two runners-up of our 1932 Competition, Norman G. Bull '36 and John R. Graham '36, whom we commended to the Undergraduate Scholarship Committee, had both won freshman scholarships, as well as Marshall M. Holcombe '36, winner of the Washington Regional Award, was greeted with applause, as were the one-minute speeches by the last three regional scholarship winners, Arthur Leonard Conn '34, Leonard S. Wiener '35, and Marshall M. Holcombe '36, whose ability to give good accounts of themselves on short notice gave further evidence of the care exercised in their selection by our Regional Scholarship Committees of the past.

Following a check-up of those present by decades of classes and by courses, conducted by our magnificently irrepressible Dr. Gregory, the meeting broke up into groups of mutual interest, but not before the Secretary had ascertained that the undergraduates present included: M. A. Baskin '33, J. Talbert '35, W. H. Brockett '35, N. E. Ruckman '35, A. L. Conn '34, H. B. Backenstoss '34, Edgar B. Chiswell, Jr., '34, Herbert J. Lidoff '34, Gordon L. Way '34, Towers Doggett '36, Thomas A. Terry, Jr., '36, Frank S. Walters '35, Edward K. Dougherty '35, Leonard S. Wiener '35, W. F. Swanton '33, Marshall M. Holcombe '36, and the alumni members: Frederick W. Swanton '90, Proctor L. Dougherty '97, A. B. McDaniel '01, J. H. Gregory '95, A. M. Holcombe '04, T. C. Atwood '97, R. C. Atwood, William E. Swift '95, Arthur L. Sherman '06, Harry E. Whitaker '09, A. C. Dort '09, W. E. Lutz '17, William K. MacMahon '22, Frank L. Ahern '14, Oliver G. Green '30, G. V. Patrick '28, C. Brigham Allen, Jr., '29, Thomas M. Roberts '98, Louis J. Grayson '19, and W. I. Swanton '93, and the Secretary.

Visiting Technology men are always welcome to attend the meetings of the Club.—JOSEPH Y. HOUGHTON '26, *Secretary*, 402 Shepherd Street, Chevy Chase, Md.

The M. I. T. Club of Western Pennsylvania

The regular January Meeting of the Club was held in conjunction with the mid-winter meeting of the Pittsburgh Section of the American Institute of Electrical Engineers and the Electrical Section of the Engineers Society of Western Pennsylvania, on Tuesday evening, January 10, at the Fort Pitt Hotel, Pittsburgh, Pa. A buffet supper was served at 6:30 p.m. in one of the hotel dining rooms. Following this, the meeting adjourned to the Norse Room, where moving pictures were shown while the crowd was assembling.

Short talks were given by student representatives of the American Institute of Electrical Engineers at the University of Pittsburgh, West Virginia University, and the Carnegie Institute of Technology. Mr. Thomas Spooner, '09, Chairman of the Pittsburgh Section of the American Institute, introduced the speaker of the evening, Mr. H. P. Charlesworth.

It was a rare privilege for the Club to be able to hear Mr. Charlesworth, who is a graduate of the class of '05, President of the American Institute of Electrical Engineers, and Vice-President of the Bell Telephone Laboratories, Inc., New York. He spoke briefly on the business affairs of the American Institute, and then delivered an address entitled, "New Frontiers through Research and Engineering." This was illustrated with lantern slides, composed of photographs, maps, and charts.

Mr. Charlesworth traced the development of telephony across the continent, and explained in more detail what had been done in transoceanic telephony. He also outlined what remained to be done to reach the ultimate goal of connecting practically every telephone on the globe with every other. He explained the difficulties and advantages of the long and short wave systems, the arrangements for "scrambling" and "unscrambling" the speech, and he outlined the problems of language and time differences which have to be overcome.

At the close of the address, we were treated to an actual demonstration of transatlantic telephone service. Mr. Charlesworth picked up a hand set from the speakers table, and was connected with Colonel H. E. Shreeve, Technical Representative in Europe of the A. T. & T. Co., who was speaking from London. In Pittsburgh, it was 9:30, Tuesday evening, and in London, 2:30, Wednesday morning. Col. Shreeve's voice was heard clearly throughout the room by means of amplifiers, and afforded a most effective illustration of the evening's topic. Mr. Frank Chesterman, '05, past President of our Club also conversed with Colonel Shreeve.

Concluding the speaking part of the program was a short speech by Mr. A. K. "Rosey" Rowsell, popular Pittsburgh entertainer, who soon had the crowd roaring with his rapid fire delivery of humorous stories. The Entertainment Committee had in addition provided an

ingenious horse racing apparatus, and now opened up a gambling concession with stage money which provided additional relaxation for anyone with a gambling instinct. Over 350 people were present, and the members of our Club were well represented in that number.—C. M. BOARDMAN '25, *Assistant Secretary*, Duquesne Light Company, Pittsburgh, Pa.

CLASS NOTES

1875

The Class held its 51st consecutive annual dinner meeting at the Engineers Club, 2 Commonwealth Avenue, Boston, Saturday evening, January 21.

As a side dish there was food for deep thought (you youngsters!) in every one of those words "51st consecutive annual dinner meeting!" And for still deeper thought when we consider that on that occasion Tom Hibbard celebrated with us, or we celebrated with him, if you please, his 51st year as President of the Class of '75. May his shadow never grow less!

The following sketch was written by our late classmate, Henry Lee Jacques Warren, who died February 10, 1932, published in the "News from the Classes and Clubs" in the February, 1932, number of *The Review*, and was recorded in connection with our memorable meeting of March 12, 1932: "For several years following graduation the Class had no reunion. In 1882 the Class Society was brought back to life under the name of Class of '75 M. I. T. Officers were chosen, by-laws adopted, and the first annual dinner was held. Thomas Hibbard was made President and he has served continuously for 49 years — it will have been 50 years when this is published in the February Review. These notes are written the day after Christmas. On interviewing Bursar Ford and Dean Lobdell they confirmed my belief that '75 is the only Institute Class which has held 49 annual dinners without missing a year."

A glowing tribute was paid to Warren by his loyal friend and classmate, President Hibbard, in the class notes section of *The Review* in April, 1932. Of the 11 members of the Class still living, those present were: President Hibbard, Edgar S. Dorr, Richard S. Atkinson, and Joseph W. Homer.

After a sumptuous but inexpensive repast which did credit to the Engineers Club and was much appreciated, a cordial letter from Frank Lyman was read. It doubtless touched a sympathetic chord in the hearts of all of us octogenarians or near-octogenarians and, therefore, I believe, it will be considered no breach of confidence by its author if it is published here. It reads as follows: "Thank you for your letter in re Class '75 dinner on the 21st of January next which I fear I shall not be able to attend. When one is 80 years old, a trip to Boston and a night there seems a bit formidable, especially as I have to be in New York a part of that week. — I should be very glad indeed to

1875 Continued

attend, but I doubt if I shall feel myself able to do so. With best wishes for the New Year."

The other members of the Class are: Samuel L. Abbott, San Francisco; John Cabot, Weehawken, N. J.; George H. Eddy, Fall River, Mass.; and William A. Prentiss, Holyoke, Mass.

There is also one other member, William Hector Bush, whom I have unsuccessfully tried to locate either in Orlando, Fla., or in St. Louis, Mo. I should be glad to hear from him and if any one will be kind enough to send me his address, I shall be grateful.

And now it is our sad duty to record the death of Frank H. Pierce on January 8 in his 82nd year at New Haven, Conn., where he had resided for over 20 years. He is survived by a son and two daughters. His home was at 1275 Chapel Street, New Haven, where he lived with his older daughter.

Pierce was connected with the Class during its first year. After leaving he spent four years as machinist and clerk with the National Screw Company, Hartford; five years raising live stock in Kansas; three years with Pierce Screw Company, Mt. Carmel, Conn.; 20 years with Mt. Carmel Axle Works; and 17 years with the Union and New Haven Trust Company as custodian of deposit vaults, from which position he retired several years ago.

Pierce was a genial, whole-souled fellow whom it was a pleasure to meet. He greatly enjoyed music and games; in fact he had been a church organist in early life, for 14 years. Lately he had been a devotee of bridge and rarely missed his daily rubber with his family. A great reader, he usually sat up to a late hour with his books. He greatly appreciated calls from his fellow members, especially those of our late Secretary, Warren, whose itinerary included a stop-over at New Haven to see Pierce whenever he traveled that way. The writer (Hibbard) was agreeably surprised on finding a calling card from Pierce a few years ago, and lost no time in hunting him up in West Roxbury, where he was visiting a sister and renewing an old friendship. A later call on him at New Haven, revealed him an active and upstanding man by no means showing his years. Since then, rheumatism had somewhat interfered with his activity, but he enjoyed life fully to the end. Pierce was the first historian of the Class when it was organized in 1871. The Class, lacking representation at the funeral, sent a floral tribute.

News has been received of the death of William R. Webster sometime in January.

To return to the meeting, when the Class got down to business, it was found that the book in which the Class cash accounts had been kept since January 26, 1883, almost 50 years ago to a day, was dropping to pieces, so it was voted to have it rebound to give it a new lease of life.

The Class then proceeded to make its will, so to speak, by unanimously recording a vote as to what should eventually be done with the residue of money, if any, left in its treasury. But that, of course,

is a profound secret. — JOSEPH W. HOMER, Secretary, 38 Webster Place, Brookline, Mass.

1876

It is with regret that I report the death of Charles Rich on December 24, 1932.

Charles Leon Rich was born in Calais, Vt., March 9, 1853. He was graduated from M. I. T. in the Class of 1876, in the Department of Civil Engineering. For a few years he taught in the public schools in Vermont and Peterborough, N. H.

In 1883 he entered the employ of the Monadnock National Bank at East Jaffrey, N. H., and served as teller and later as cashier until 1930.

He was intimately connected with every worthy activity of the town. He also served in both branches of the legislature, and for 20 years was a member of Troop A, New Hampshire National Guard. He was held in high esteem by his friends and fellow townsmen for his high character, fearless independence, and sympathetic generosity. — CHARLES T. MAIN, Secretary, 201 Devonshire Street, Boston, Mass.

1877

It is with great regret that I record the death of Thomas F. Stimpson on the morning of December 27 after an illness of one week. He had been troubled by a bronchial disturbance which became acute and brought on complications resulting in his death.

Stimpson was born in Swampscott, Mass., on February 19, 1856. He graduated from the Institute in '77 in the Department of Mining Engineering, subsequently serving as private assistant to Professor W. R. Nichols of the Department of General Chemistry and also as assistant in the chemical laboratories at M. I. T. In 1879 he entered the employ of the Silver Spring Bleaching and Dyeing Company and later took charge of the printing, remaining superintendent of printing for about 25 years. Later on he began duties as superintendent of the plant. He was connected with the Imperial Printing and Finishing Company at Bellefont for 17 years, part of the time as superintendent, but for the past few years serving in an advisory capacity. He was a member of the Technology Club of Rhode Island, the Royal Arcanum, and the Loyal Association. He never held any public office, but he served on the Providence School Committee for a short time years ago.

His hobby was fishing with rod and reel and years ago he was considerably interested in boating and single-hander yachting. The latter sport was indulged in in a very modest way as to equipment, but it was a good life. He reckoned the sports of fishing and sailing and, in his earlier years, hunting, as parts of his most valued resources.

He is survived by his wife, Luella J. Stimpson, and two sons, Edwin F. '11 and Harry P. Stimpson.

Having investigated various records in the pursuit of lost members, the following news was uncovered in regard to Frank Reed in the Boston *Herald* of June 20,

1902 in which his death on June 17 was recorded. Mr. Reed was a Free Mason, a member of the Henry Price Lodge; Signet Chapter, Coeur de Lion Commandery of Knights Templar; a member of the 999 Heavy Artillery; and an influential member of the First Baptist Church. He was senior member of the J. T. Reed Company. I was interested to learn more about him so walked about the streets of Charlestown and soon found the firm of J. T. Reed was in existence and still doing business at the old stand and under the control of the Reed family. I was directed to the New England Tel. and Tel. Company at No. 6 Bowdoin Square and there met Harold F. Reed, son of Frank Reed, who told me his mother was living at his home 221 Grove Street, Melrose, Mass. This accounts for another of the missing men of the Class of '77.

Notice of the death of George Howard Monks has been received. The following account appeared in the Boston *Herald* of January 27: "Dr. George Howard Monks, former surgeon-in-chief of the Boston City Hospital, one-time lecturer on surgery at the Harvard Medical School, and a noted writer on medical subjects, died yesterday at his home, 51 Commonwealth Avenue, Back Bay. He was 79 years old. — Funeral services will be held tomorrow at 11 a.m. at St. Paul's Cathedral. Burial will be private.

"Dr. Monks was born in Boston, March 28, 1852, son of John P. and Delia S. (Hatton) Monks. He prepared for college at Boston Latin School. He was graduated from Harvard College in 1875 and entered the architectural department of M. I. T., where he studied the following year. He then decided to study medicine and entered the Harvard Medical School, from which he was graduated in 1880.

"After a year of surgical internship at the Massachusetts General Hospital, Dr. Monks studied further for four years at Vienna, Leipzig, Heidelberg, Dresden, Paris, and other continental medical centers. At the end of this period he passed examinations admitting him as a member of the Royal College of Surgeons of England.

"He began the practice of surgery in Boston in 1884, and was appointed district physician of the Boston Dispensary and later visiting surgeon to the Carney Hospital. In 1890 he entered the Boston City Hospital and was promoted through various grades to surgeon-in-chief in 1910. He resigned in 1914 and was appointed consulting surgeon.

"From 1886 to 1914 Dr. Monks was connected with the Harvard Medical School, resigning after lecturing on surgery at the school for 11 years. From 1886 to 1926 he was connected with the Harvard Dental School and in those 40 years he provided a valuable link between the medical and dental schools. When he resigned, he was professor of oral surgery. He was appointed a professor emeritus.

"Dr. Monks's medical writings were extensive. He published 56 papers, chiefly on surgical subjects, and also biographical sketches of contemporary surgeons.

1877 Continued

His most important surgical contribution was in 1904 when by invitation he gave the Mütter lecture at the College of Physicians at Philadelphia on 'Studies on the Surgical Anatomy of the Small Intestine and Its Mesentery.' These studies have been frequently quoted since that time.

"He was at various times chairman and Secretary of the surgical section of the Suffolk District Medical Society, President of the Suffolk District Medical Society, President of the Boylston Medical Society, Vice-President of the American Surgical Association, fellow of the American Medical Association, fellow of the American College of Surgeons, first President and co-founder of the Boston Surgical Society, senior member of the New England Surgical Society, President of the Boston Medical Library, Boston Society of Medical Sciences, American Medical Association, Massachusetts Medical Society, and the Boston Society for Medical Improvement.

"During the War, being over age for active service, he was a member of the volunteer medical service corps and division medical adviser for the Red Cross. — One of his hobbies was sculpturing, in connection with which he modelled a number of subjects, including a bust of George Augustus Peabody, which is now in the Peabody Museum at Salem.

"He was married to Miss Olga Eliza Gardner in 1897. He leaves his wife and three children, the Rev. George Gardner Monks, headmaster at the Lenox School, Dr. John Peabody Monks, a physician in Boston, and Miss Olga Monks. He also leaves a sister, Mrs. Walther Hempel of Dresden, Germany." — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1883

The Class Secretary, feeling the weight of years, and remembering that next June is to be the Fiftieth Anniversary of our Class, has been writing some of the members to secure their desires regarding the place of reunion. The following letters have been received. Eppendorff writes as follows: "Answering yours of the third, in reference to our Fiftieth, I am still looking forward with great interest to its consummation early in the summer.

"As for the exact spot where the anniversary will be held, I have nothing to suggest, unless it be the hotel at Hyannisport, where we met so many years ago.

"In this connection, will there not be some sort of celebration for us at the Commencement Exercises in Cambridge, or can we shunt those altogether as we did last time?

"By the way, what is the exact date, or rather, the week, that will be given up to this celebration?

"With kindest regards and Season's greetings."

Harvey M. Mansfield writing from Tampa, Fla., says: "Your letter of the third inst. received and I was (as seems to be *au courant* among great personages) 'horrified' to learn that I am in line for a 50th anniversary.

"As for a place in which to endure it, I like the shore all right, but why go so far away from the Hub? Having been away so long, however, I am naturally out of touch with the whole situation, and should defer to the judgment of those better posted. Whatever place is selected, I only hope I shall be able to be there this time.

"As a matter of interest to Tech men, I will take the liberty to quote a few lines from a letter written today to Professor Locke, Alumni Secretary: 'You may be interested to know that the Tech men living in this immediate vicinity met today and formed a preliminary organization, electing the writer as President *pro tem* and Mr. Malcolm R. McKinley '19, Secretary, the intention being that this will be the nucleus around which the larger body, taking in alumni from Central Florida, will be formed as soon as replies are received to notices now being sent out.

"There was so much enthusiasm manifested on the part of those attending this meeting, and if the same spirit prevails at the gathering of the larger body, we shall have a creditable organization."

"Thanking you for your letter and with my best wishes for the year just begun."

A letter from Kingsbury, written from Scranton is as follows: "It is difficult to realize that the Class of '83 is about to celebrate its Golden Anniversary; the proposed meeting will be most interesting.

"I appreciate the suggestion that I give my views as to a place for foregathering; I believe that the selection of the place would be better left to the judgment of those Class members who have had the most to do with former meetings.

"Thanking you for your kindly greetings, and trusting that the New Year may be good to you in every way."

George H. Bryant writes from Newport: "I have your letter of the third. You are certainly taking time by the forelock in arranging for our Fiftieth Anniversary.

"As to the place, I have no particular preference. The Oyster Harbors Club sounds good, though I know nothing about it. Also The Gables at Hyannisport is a favorite stopping place for us. Any place, if not too far away, which suits the majority of the boys will be agreeable to us and we hope to be able to attend.

"Mrs. Bryant has been in poor health for the past year, but is much better now, and if the improvement continues, I should think she might be able to go to the reunion with me.

"Best regards to your wife from both of us."

George Underwood, writing from Peabody, Mass., suggests the Salem Country Club, where we had a very pleasant reunion two years ago. There is a very excellent hotel in Salem nearby, which has quoted quite attractive rates. This would be a very convenient place for us to stop so as to be handy for the festivities we will be expected to attend in Boston.

THE TECHNOLOGY REVIEW

Harvey Chase encloses a letter from Locke stating that we will have to appear at the Commencement Exercises in caps and gowns. The Class Secretary does not know how he would feel with so much millinery.

It is hoped that all members of the Class who have any ideas about our reunion will send them in promptly to the Acting Class Secretary. — DAVID WESSON, *Secretary*, 111 South Mountain Avenue, Montclair, N. J.

1889

Jasper Whiting has written an amusing and entertaining book of original charades which is illustrated with drawings by Gluyas Williams and published by Bruce Humphries, Inc., Boston. The book is entitled "Cut Off My Head," and is written in the old manner but with the pen dipped in the ink of modernism.

William H. Dow of Portland has been reelected President of the Portland Society of Natural History.

Frank Hart was elected President of the United Fruit Company at the January meeting of that company. The Boston Herald commented as follows: "Mr. Hart has been thoroughly familiar with the business of the company, not only through his residence for some years in the tropical countries in which the company operates, but as a director and member of the executive committee since 1901 and as chairman of the finance committee. Mr. Hart was born in New Bedford; was of the class of 1889 at the Massachusetts Institute of Technology; married Helen Bronson Hobbey of Northampton in 1896, and resides on Beacon Street. On leaving college he went to Jamaica, British West Indies, and was interested for several years in engineering problems connected with the island's agricultural development. He then went to Colombia as manager of the Cartagena-Magdalena railway system. On June 4, 1901, he was made a member of the board of directors of the United Fruit Company and in November of the same year was elected a member of the executive committee. He has served the company in that capacity ever since. His long connection with the Old Colony Trust Company of Boston is also noteworthy. Mr. Hart is the author of the very authoritative books 'Admirals of the Caribbean,' 'The Disaster of Darien,' 'The Siege of Havana,' and is a member of a dozen learned societies, among them the American Antiquarian Society; American Academy of Arts and Sciences; Massachusetts Historical Society; Colonial Society of Massachusetts, and Odd Volumes Club of Boston. He is a fellow of the American Geographical Society, the Royal Geographic Society, Imperial Institute of London, Pan-American Society, and China Society. Among his clubs are the Somerset, St. Botolph, Exchange, Union, University; Grolier, Indian House, New York; Wamsutta Club and the Royal Societies Club of London."

Willard W. Estabrook died on December 3 at his home 21 Parkman Street, Brookline. The Boston Evening Trans-

1889 Continued

cript carried the following account: "He was born October 5, 1867, and was the son of Benjamin Wilde Estabrook and Sarah Wilde Estabrook. He never married, and was a graduate of the Massachusetts Institute of Technology. For 28 years he had been fire commissioner for the Town of Brookline, and had been interested in the well-known tobacco firm of Estabrook and Eaton, long located in the downtown section of Boston. Mr. Estabrook was a 32nd degree Mason. His nearest survivor is a sister, Mrs. Eugene Cochrane (Ella Estabrook), living at the same Parkman street address."

From the Boston *Transcript* the Secretary learned of the death of Miss Delia M. Stickney at Los Angeles, Calif. Miss Stickney was for 41 years a teacher at the Cambridge Latin School, retiring in June, 1929. A graduate of Salem Normal School, she was one of the first women to receive a degree from the Massachusetts Institute of Technology. She is survived by her niece, Alice D. Weston, 2836 South Raymond Avenue, Los Angeles, and a brother, Frank B. Stickney, of Maplewood, N. J. — WALTER H. KILHAM, *Secretary*, 9 Park Street, Boston, Mass.

1891

Clarence Edgar Whitney died suddenly of heart failure at his home in Hartford on January 22 at the age of 63. His funeral was held at the home of his sister, his ancestral homestead on Farmington Avenue, on January 25. The Class of '91, through the assistance of Horace Ensforth, sent flowers to the funeral.

Clarence Whitney was born in Hartford, the son of Amos Whitney of the well-known concern, the Pratt and Whitney Company. His ancestors were among the early settlers of Massachusetts, John Whitney living in Watertown in the middle of the Seventeenth Century and Lieutenant Levi Whitney being an officer in the Battle of Lexington. After an early education in the Hartford schools, he entered the M. I. T. in 1887 and remained for three years. Instead of completing the course, he accepted an offer from his father to study German industrial methods in Essen and Berlin for a year. He then entered the employ of the Pratt and Whitney Company as an ordinary workman, rising step by step until he became the valued assistant of his father. He soon became interested in other manufacturing concerns and finally organized his own company, the Whitney Manufacturing Company, which specialized in bicycle and automobile chains. In this and other business ventures he was very successful. Among them were the Hartford Faience Company, the Hansen Whitney Company, and the Hansen Tap and Die Company. He became one of the most important figures in the industrial life of Hartford and of Connecticut.

He was a director and strong supporter of the National Association of Manufacturers for many years. He was a strong believer in the open shop and worked fearlessly for a cause that was not always popular. During the War he fought

valiantly against the curtailment of working hours and wrote a letter to his employees on the subject which was reprinted in hundreds of newspapers all over the country. In this he said: "Until the War is over we are willing to operate at a profit, or at no profit, or at a loss, whichever may best serve our country and we object to advertising any propaganda for an eight-hour day when we know it would mean ruin for our country." Yet withal he was most solicitous for the welfare of his employees and was beloved by them. His years of apprenticeship in his father's plant had given him first-hand knowledge of working conditions and he was constantly seeking to better these conditions.

An editorial in a Hartford newspaper on the day of his death stated that he might in many respects be called Hartford's leading industrialist. "He possessed a great faculty for leadership. He was actuated by an unflagging energy and sustained by ample courage. . . . He believed unionism to be a menace and was most active in the promotion of the so-called open shop. Naturally this made him the center of much hostility; threats against his life and safety . . . did not deter him from following the course he believed to be right."

"The success of the open shop or American plan throughout the country is due to him more than to any one man," said his friend M. S. Little in a tribute to his memory. "His unique personal magnetism and an unusually keen sense of humor won him countless friends. . . . His uncompromising adherence to principle, courage, and ability gained their respect and held them. . . . No one will ever know the limit of his generosity because his acts of kindness were so quietly carried out that they became known only to those whom he befriended."

Whitney married Nellie Hurlburt of Hartford in 1900 and besides a widow he left four children and six grandchildren. He was a member of three country clubs, the Engineers Club of New York, and many other organizations. He was a member of the Hartford Lodge A. F. and A. M., and was one of the Sons of the American Revolution. In his questionnaire for the Class Book in 1931 he said his interest in sport was "almost zero" and that his hobbies were "family, business, and open shop." Also that he had traveled in Europe and the West Indies.

Clarence was quite regular in his attendance on our class outings and his humor and good nature endeared him to all present. He became famous for his amusing speeches both in "full and neglige dress." His loss will be keenly felt by all members of the Class who were fortunate enough to come in contact with him at the outings and elsewhere.

Barnard Capen sent in the following: "I received a letter from Clarence dated December 7, in which he says: 'Am a little late but wish to express my very deep appreciation for your message of good wishes on my birthday. Hope you are well and happy and whenever you have a birthday, you can understand that

I am, through my subconscious mind, reciprocating the spirit of friendship which you have expressed.' I am very sorry. I always liked Clarence and shall remember him with affection."

Charlie Waterman has retired from the American Tel. and Tel. Company and gone to Coral Gables, Fla., for the winter with his family. — Ambrose Walker has moved his office from 9 Cornhill, Boston, to 5 Carpenter Street.

Alonzo J. Hammond, the official nominee for President of the American Society of Civil Engineers for 1933, is a Hoosier, educated in the public schools at Frankfort, Ind. He graduated from Rose Polytechnic Institute in 1889, received the degree of M.S. in 1894, and that of C.E. in 1898. He also took a postgraduate course at the Massachusetts Institute of Technology in 1890-1891.

"He carried on a general engineering and architectural practice at Frankfort until 1898, when he joined the Chief Engineer's staff of the Vandalia Railway for a period of three years at Terre Haute, removing in 1901 to South Bend, where he was city engineer until 1910. During the same period he carried on a very wide practice in electric railways, hydroelectric plants, bridges, and municipal work.

"In 1910 he went to Chicago as consulting engineer for the Commission on City Expenditures, reporting on the 14-foot water tunnel at 73rd Street. In 1911 he became Chief Engineer of the Bureau of Public Efficiency, investigating, among other things, the electrolysis of city water mains of Chicago. During 1912 and 1913 he was Engineer of Bridges and Harbor in the Department of Public Works, where he had charge of the design of a number of the important bridges, in particular the Lake Street and Michigan Avenue double-deck bascule bridges.

"In 1914 he was engaged as consulting engineer for the Chicago Union Station and later became Assistant Chief Engineer in charge of engineering design and construction of that \$75,000,000 passenger terminal.

"Resigning this connection in 1922, he joined James O. Heyworth, Inc., as Chief Engineer, and for three years was active in the design and construction of hydroelectric plants on the Mississippi, Chipewewa, and Fox Rivers.

"For two years following this connection, he was Chief Engineer of the Mellon-Stuart Company, in the Chicago Office, representing that company in the huge internal improvement program of Cuba.

"Since then he has engaged in private practice as consulting engineer in Chicago, retained by the city on various projects such as river straightening, dock walls, bridges and viaducts, and also for other cities for grade separation and for passenger and river-rail terminals.

"Mr. Hammond served as director of the Society in 1926-1928, and as Vice-President in 1929 and 1930. He is a member of the American Institute of Consulting Engineers, the Western Society of Engineers, the American Railway Engi-

1891 Continued

neering Association, a member of the Executive Committee of the American Engineering Council, of the Chicago Engineers' Club, and of the Board of Managers of Rose Polytechnic Institute.

"He is a former president of the Chicago Local Section of the Society, and a former president of the Indiana Engineering Society."

William H. Punchard was one of the three judges of the Norfolk County Game Plan contest which culminated December 17. This was sponsored by the Massachusetts George Washington Bi-Centennial Committee through a subcommittee on Town Planning of which Mrs. Charles Sumner Bird was chairman and Gorham Dana was a member. All high school children in the county were given an opportunity of describing with a plan and description what they would like to see their town develop into 100 years from now. Several hundred plans were submitted and Punchard was credited with doing the bulk of the work in judging these plans.

Charlie Garrison writes another of his interesting letters from Long Beach, Calif. What he sees from his "deck" is described in Charlie's inimitable style: "The sky is a beautiful crimson near the horizon; the wet beach reflects this in iridescent colors as the waves recede, while the water between takes on a luminous blue. A pink mist rises over the island and from the gamboling ships is seen a string of electric lights from stem to stern. Long Beach, four miles to the west, has thrown on the city lights, making a brilliant display. These extend to Wilmington, which in turn join those of San Pedro, making a bright, shimmering quarter circle many miles in length. In this curve is the war fleet. Their searchlights turned upward, and wave back and forth, the rays constantly crossing — some 20 or 30 lights — making the sky a flashing fairyland. The twilight is short, the blue of the sea deepens, landmarks vanish and only the lights remain.

"As if this wasn't show enough for the deck to put on, we will take a look at about 3.30 A. M. The sea shows a shimmering wake of silver made by the gibbous moon, but this is the least of the beauty. Above, at the top of its arc is the constellation of Orion and others in attendance each side. The mighty hunter pursues the bull. Taurus flees, its most conspicuous group the V-shaped Hyades with Aldebaran, the reddish first magnitude star the outstanding feature. Beyond are the Pleiades, the six famous sister stars. The ancients used to see seven, but one has either faded from view or perhaps Lens, assuming some charming shape, repeated his successful wile with Europa. He must have done it in the daytime when we couldn't see it! Look at Orion again, at the upper left corner of the great parallelogram and see the bright star Betelgeuse. His diameter is the size of the earth's orbit, 186,000,000 miles, taking light 1,000 seconds to traverse it. Then see the stars in the center of the figure, making the belt and sword and the famous nebula. Following Orion

are Sirius and Procyon. Sirius, the brightest star in the heavens, has a dark companion, which unfortunately we cannot see, although it is white hot and known as a 'white dwarf.' It is small, but oh my! a cubic inch weighs 2,000 pounds! Surely if there be 'music of the spheres' this must be its most glorious page. All this and more can be seen from our California deck."

Charlie Hanington is one of the trustees of the Mead Collection of Antiques recently presented to the City of Denver. The following appeared in the *Denver Post*: "In the conviction that no great art can be of value when secluded from the world and that the treasures of antiquity possess beauty and meaning only when they are accessible to everyone, Walter C. Mead, Denver art collector, presented Monday his entire magnificent collection of English Sheraton furniture to four trustees for exhibition in the Denver Art Museum. The collection, accumulated through 25 years of extensive travel and diligent search by this somewhat shy, modest connoisseur, is arranged in two large rooms of the museum on the fourth floor of the new municipal building. In the brief, formal presentation, Mead emphasized terms of the trust, specifying responsibility of the trustees, E. S. Kassler, Thomas A. Dines, Charles Hanington, and W. D. Lippitt, to safeguard the collection."

Leonard Wheeler writes from Troy, Ohio, that he visited New England in September to see his family — Carleton Read writes of the arrival of a granddaughter, "She is the daughter of our baby, Lawrence M. Read, a graduate of Bowdoin College. She was born at Flushing, L. I., September 6, 1932. We were down there three weeks and during that time made a trip to the end of the island and also to Bayside to get a look at the home of Phil Lord (Seth Parker) who graduated at Bowdoin one year ahead of Lawrence. We returned home by way of the Adirondacks, Vermont, and the White Mountains. The baby had a trip to Worcester before she was two months old."

George Atkinson writes from Limington, Maine — "We are down in my home town as business was so poor that it seemed the best thing to do. We have a nice old house, eight rooms, oil heat in the stoves, and as we are right in the village on a much travelled road we see all that goes on. A nice brick library with latest magazines and books gives us plenty to read and there are lots of nice people. We go to the old church where my great grandfather was installed as the first minister, and find it very pleasant."

Another nice letter from George Hooper in Pasadena: "Very mild winter here thus far, thermometer goes to 70° or over every day.

"We had 'open house' on January 2 for friends who wished to attend the football game, our house being so near the Rose Bowl that it is easy to leave cars here and walk down. Our house was literally open as the day was so mild that all doors and windows were open, our friends circulating freely in and out.

THE TECHNOLOGY REVIEW

"I am sorry to learn of Knowles' death. We were in the same section during freshman year and I found him always genial although also very direct and full of business. He was another who overworked during the War."

Robert Ball writes Barney from Cambridge, England: "It was very kind of you to send me a token for my birthday. I much appreciated it and it is nice to think of one's distant friends in touch as the years pass. I pull out the list of my classmates every Christmas and wonder how they all are but I am always afraid lest the grim reaper has been busy in their ranks and that some have gone on during the year. I was sorry to hear from Gorham Dana that we had lost Morris Knowles. I hope this is the only loss that we have sustained.

"We are all very well. My son is in the Colonial Civil Service and is at present in Trinidad. He writes that the cocoa planters find it difficult to compete with the Gold Coast in selling their product and that they are replacing this crop with grapefruit, which is more profitable and for which there is a good demand as it is now much used in Europe. He will be home on leave next summer. My daughter is in London acting as house manager for a training center and likes her job very much.

"There are some signs of a revival in business over here though nothing startling yet. But we do not despair and hope for better things. It is an extraordinary state of affairs all over the world, in some places overproduction and in others a scarcity of produce. It is very difficult to get a correct account of what is happening in distant places but from our newspapers it would seem that with you there were also many out of work and that business is bad. I would like to get across to see the Chicago Exhibition next year but I fear it will not be possible for me to do so. I was in Chicago in 1893 when the last fair was on and remember the gigantic scale on which everything was done, which is to be surpassed by next year's show.

"I hope the new arrangements at Tech are working well. The division of responsibility should mean a more smoothly working organization. It always appeared to me that, with the vast numbers of students, it was more than one man could handle. We have not the same difficulty in our Engineering School, for the numbers are not nearly so large and the division among 17 colleges distributes the responsibility of looking after the students. I see *The Technology Review*, which is taken in at our library, and it is one of the most popular magazines that we have; the pages are well-thumbed. It is excellently edited.

"Gorham tells me of the pleasant visit he with four others paid to you. It makes me envious to think of these pleasant gatherings that, owing to distance, I cannot share.

"Dr. Tyler and his wife paid us a pleasant visit last summer and he met an old friend here, Professor Nuttall, with whom he used to study when at Göttin-

1891 Continued

gen in years gone by. Dr. Tyler is doing some work in Washington in connection with the Technical Department of the Congressional Library.

"We are having a very mild winter. There has been no frost so far and we have roses blooming out of doors still. I never knew this to happen before." — HENRY A. FISKE, *Secretary*, Grinnell Company, 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, *Assistant Secretary*, The Early Convalescent Home, Cohasset, Mass.

1895

Dear Mates: From all indications, everyone appears to be struggling with the adjustment of their budgets, and apparently have "sliced" the appropriation allotted to the cost of correspondence with your secretaries.

While it may be true that a readjustment in many cases is necessary, it is false economy to withhold any such contact. These are the years of our lives in which we must grow closer, and a word of hope, faith, or good will from one may be the blessed balm the other fellow is looking for. You will always find our correct address in this Technology Review. Please drop your line promptly.

Our ever-faithful Fred B. Cutter held a two-man conference with Arthur L. Canfield, in New York City, on January 18, preparatory to arranging the spring meeting of the New York '95 Lunch Club. We have advice that Cutter is rounding up the sick list in order to have the attendance above normal at this first meeting of the year 1933. — LUTHER K. YODER '95, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDNER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

These notes are being written on January 24 and news is scarce. Arthur Baldwin failed to make good his promise to see the secretaries in Boston in December. Evidence from other sources indicates that he was in town, but was not quite up to the mark, but whether his difficulty was lumbago, or rheumatism, or arthritis, or just plain stomach ache, we do not know.

Jacobs did make good on his promise to come to town, and was in attendance at the Geological Convention in Boston between Christmas and New Year's. The Secretary attended some of the meetings with him, and at the smoker there was also present Myron W. Fuller. Fuller announced that he and Mrs. Fuller had their plans all made to start off early in January for the South Atlantic and South America to cover what they missed out on at the end of their trip last year. They sailed January 4 on the *Majestic* for England. Their itinerary includes Port of Spain, the Canary Islands, Brazil, Uruguay, and Argentine. From the latter they will proceed to the seldom visited Falkland Islands, off Cape Horn, after which they will continue through the Straits of Magellan and home by way of

the west coast and Panama, with a side trip to the islands of Juan Fernandez, on which Alexander Selkirk was marooned for four years, giving rise to the story of Robinson Crusoe.

Jacobs was also down to Boston again the middle of January on seismographic matters, but he contracted a heavy cold, and decided that it would be wise for him to return to the home fireside in Burlington. His wife kept him in bed for a week.

Since reports will soon be forthcoming from the new Fuller trip, we will have to push through the remainder of their African tour. We left them last month at Tabora. We now go on.

"We have just completed our trip across Central Africa along the equator, taking 45 days for a distance, as the crow flies, of 1,900 miles, or not far from that between Boston and Denver, made by an American train in less than three days. The actual distance covered by way of the Congo and Lakes Tanganyika and Victoria was, however, nearer 4,000 miles, and the time included several waits of from one to five days for connections, since many of the boats and trains ran only at intervals of from seven to 21 days. The service was surprisingly good, whether by rail or by river or lake steamers. Dining cars were usually attached to trains even though there were only a dozen passengers. All coaches were of the compartment type with berths. No charge was made for the latter, sterilized bedding in sealed bags being rented at about 50¢ a night.

"From Tabora, from which we last wrote, we ran 250 miles north by train across the broad plains, broken by fantastically sculptured granite hills, of the Tanganyika Plateau to Lake Victoria at an altitude of 3,726 feet. Here, from a point not far from that from which Speke first saw the lake in 1858, we took a steamer for 250 miles along the picturesque, island-dotted, and often mountainous east coast to Kisumu at the northeast corner, from which we drove by auto 160 miles along the north shore to Jinja, the elusive source of the Nile found only after a search of centuries. Here the river, half a mile wide, pours from a bay of the lake over Ripon Falls, perhaps 25 feet in height, on the first stage of its long course to the Mediterranean, nearly 3,000 miles to the north. The pool just above the falls is a resort of the hippopotamus, and we searched it carefully, but apparently only an occasional rock broke the surface. Suddenly, however, the most natural looking of all the supposed ledges showed signs of movement, and dissolved, as it were, into about a dozen hippos of all sizes from babies to full-grown brown giants.

"Leaving the lake, we took a train for the 900-mile run to the Indian Ocean. The track leads across high plains and upward, with many twists and turns to the scenic mountainous summit of the Usin Gishu Plateau at nearly 8,500 feet, then plunges down into the Great Rift Valley 2,000 feet below. This depression, formed by the sinking of a strip of the

earth's crust between two fissures," has been traced from the Jordan Valley and Dead Sea in Palestine across the Red Sea, Abyssinia, and East Africa to the Indian Ocean opposite Madagascar. For hours we followed its bottom past salt or brackish lakes without outlets, then climbed out over the east escarpment at nearly 8,000 feet, thence down a broken slope to the large town of Nairobi, Kenya, at the beginning of the great grassy plains, still a mile high, known as the 'big game country' and containing one of the game reservations recently made familiar to Americans by the motion pictures 'Simba,' 'Trader Horn' and others, although the plots of the stories are often laid elsewhere, even as far away as the opposite coast. As we skirted the edge of the reservation the whole surface as far as we could see was in places dotted with antelopes and gazelles of many species, like cattle in a pasture. Zebras grazed in big herds oblivious to the train, while numbers of ostriches gazed indifferently as we passed.

"The natives of the plateau east of Lake Victoria differ markedly from those of the Congo in clothing. In the hot damp climate of the latter comparatively little, sometimes practically nothing, is worn except in the villages but in the cooler uplands skins or other coverings are in common use. Many are quite sensitive to the cold and appeared closely wrapped in blankets while we were still perspiring. There are likewise marked differences in ornamentation. In the Congo raised scars, produced by rubbing certain substances into short scratches made in fancy designs in the skin, constitute the chief decoration, but in the plateaus arms and legs are often nearly completely enclosed in brass or other rings. Big discs of the same hang on the chest, and ear lobes are extended frequently with large ornaments.

"On reaching Mombasa we found a French boat was leaving in a few days for Mohili, Mayotte, Madagascar, Nossi Be, Diego Suarez, Reunion, and Mauritius in the Indian Ocean. The chance to visit these out-of-the-way places was too good to miss. It will take about a month and a half, and will delay our return.

"We sailed, as planned, on the French steamer, leaving Mombasa on March 7, for some of the out-of-the-way islands of the Indian Ocean, and left it yesterday at the British island of Mauritius after a trip which, although only 2,000 miles in length, took 24 days.

"From Zanzibar, the last stronghold of the Arab slave trade, nearly two-thirds of all the cloves of the world are shipped, and the streets are spicy with odors from the clove warehouses. Although an English protectorate, the old sultan still lives in his 'palace,' really a very ordinary wooden building, and exercises nominal sovereignty.

"The French island of Grand Comore shows dozens of black lava flows down the slopes of its volcanic mass, with more than 50 minor centers. Moheli, also French, is likewise volcanic, but is inactive and more of the ordinary mountain type. There is no harbor and people are

1896 Continued

landed through the surf in outrigger canoes. The negro types of Africa are replaced on this and other islands by people of Malay or allied races coming in from the far east, and by East Indians.

"Mayotte, in the Mozambique Channel, and Nossi Be, off the northwest end of Madagascar, are volcanic and mountainous but inactive. Broad sugar fields are seen on the flats between the hills of the latter. Both are French possessions.

"Madagascar, 1,000 miles long and 250 miles broad, is low and flat on the west but mountainous in the center and on the east, reaching an altitude of nearly 9,000 feet in places. The French, although in possession for 135 years, have done comparatively little in the way of development, owing in part to the hostility of the natives. We stopped at one port on the west and two on the east side. At one of the latter, Diego Suarez, we sweltered for seven days under bluffs which shut off all breezes, owing to the necessity of going into dry dock to repair a propeller injured when the ship was driven into a bank in a sand storm in the Suez Canal.

"Reunion, a French island some 40 miles in diameter, reaches a height of nearly two miles and boasts a still active volcano.

"Maurelius, of similar size and likewise volcanic, although inactive, reaches an elevation of only about 2,500 feet, but is nevertheless very rugged and picturesque. Port Louis, the principal city, lies in an amphitheater of mountains with high cliffs. Between the mountains are plains with broad sugar plantations, the island being one of the great sugar centers of the world. Many of the less expensive American-made automobiles are seen on the roads, and American salmon and fruits appear on the table at the hotels.

"Although it is the height of the rainy and hurricane seasons, we have had comparatively few showers and no high winds. Three of the ports visited, however, still show evidences of hurricanes. At Tamatave, Madagascar, the harbor was lined with wrecks, and the jetties badly damaged. At Reunion trees were blown down or stripped of leaves, small houses wrecked, large warehouses unroofed or with the iron roofing curled up like paper, and steamers sunk at their docks, even in the inner harbor. Mauritius itself, in spite of its substantial buildings, shows many evidences of the great three-day hurricane of March, 1931.

"We expect to spend about ten days in seeing the island, then sail for Cape Town and South America." — CHARLES E. LOCKE, *Secretary*, Room 8-109 M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1897

On an evening of the last week of November, 1932, a notable demonstration of the transmission of speech by means of a beam of light was given in Schenectady, N. Y. On that evening Heywood Brown, a well-known New York columnist, talked into a microphone on the roof of a building in Schenectady and, by means

of a beam of light, the message was transmitted to John B. Taylor, VI, on the top of a mountain at Lake Desolation, 25 miles distant.

At Mr. Taylor's end the beam was received on a mirror, which in conjunction with a photoelectric cell and a pair of earphones enabled Mr. Taylor to receive the message. Frequencies of several hundred trillions per second give wavelengths of 1/50,000 of an inch and render this phenomena possible. This method of transmitting sound over a beam of light was developed by Mr. Taylor. Those of the Class who were at the Thirtieth Reunion in 1927 at Old Lyme will recall that Mr. Taylor gave a demonstration of this transmission over short distances during the stay at Old Lyme. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass. CHARLES W. BRADLEE, *Acting Secretary*, 261 Franklin Street, Boston, Mass.

1900

The periodical dinner of the Class took place in the Faculty Room at the Institute on January 17 and was attended by about 30 of the faithful. A pretty good turnout, considering the times, and everyone was happy, due to a large extent to the inimitable grace and good humor of our genial toastmaster, Joe Draper, who interspersed his introductions with rare or well-done stories as the occasion required. The following were present: Bowditch, Brigham, Burns, Cotting, Crowell, Davis, Draper, Fitch, Graff, Howe, Lawley, Leary, Leatherbee, McCrudden, Newhall, Osgood, Ober, Priest, Patch, Richardson, Russell, Silverman, Charlie Smith, Stearns, Wedlock and Westcoat. The speakers were: Patch, who told us a couple of interesting happenings of the Orient; Howe, the State income tax collector, gave us a few ludicrous incidents in the compiling of tax returns; Davis, chief engineer of the Boston Transit Commission, a very interesting and instructive talk on the detail of the work now being done on the East Boston Tunnel; Brigham, plant engineer of the New England Confectionery Company, on some of his heating and water cooling problems; and Charlie Smith, Vice-President of the New Haven Railroad, on some of the major obstacles confronting the railroads at the present time.

It was an evening well spent and one more rivet in the old 1900 structure which seems to be standing up so well. Letters of regret were received from about ten who had previous engagements.

The edition of January 1 of the *Washington Star* carries a story about four former Central High School students who have attained distinction in their respective fields of endeavor honored by the Alumni association at their annual reunion. Heading the list was our own Sperry who received his certificate for distinction in Public Utilities Management and is now President of the Washington, D. C., Gas Light Co.

Dick Westcoat has the sympathy of the Class in the death of his wife last November. Those of us who were fortu-

nate enough to enjoy her company at the last reunion will always remember her charming personality and beautiful disposition.

From the list of unknown addresses, please remove the name of James G. MacDonald, the old third baseman of the freshman baseball team. The scribe tried hard to get him to show up at the class dinner but with no success. Someone else try it. His address is 40 Fairbanks Road, Milton, Mass.

Another of the list of unknown addresses comes off, we regret to say, through receipt of a notice of the death on May 22, 1926, of John Fellows Lewis, Course V, whose last address was 1829 Farmington Road, Cleveland, Ohio.

We have just received notice of the death, on September 11, 1902, of Mrs. Ivy A. Kingsbury of 237 Park Street, Newton, who affiliated with our class.

J. B. Conant called up to say that he was sorry not to be able to take in the dinner and that he was feeling a lot better. We all send regards.

After a lapse of a few meetings, it was certainly nice to see Newhall at the class dinner. About the same date, there appeared a newspaper notice that Mrs. Charles A. Newhall was recently elected President of the Household Nursing Association at the annual meeting for the tenth time. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

We are on the eve of the annual Alumni Dinner and I am hoping that this will prove an exception to those of the past few years and that I shall not be the only member of the Class to be present. We are lowering the price of tickets and guaranteeing that all of the money shall be spent on food. I hope this prospect of one square meal will appeal sufficiently to the victims of the depression to produce a really respectable group of the Class. When I use the term "respectable" here you understand, of course, that I am referring merely to numbers and not to manners or morals. My next letter will have a brief review of the party with such comment on the features of entertainment as seem apposite. This you understand again is a promise and not a threat.

I had the pleasure of lunching with Anna Gallup a few days ago, she being a member of what is severally designated as the Ladies', or Women's, or Females' Technology Association. Social levels here seem to be hopelessly intermingled, only the fact of sex rises triumphant. Anyhow it was a nice party and I sat beside Anna and heard something of the interesting work which she is doing and of which comment has been made earlier in these columns. Also Anna has a brother of whom she told me who is interested in endocrine experiments — my own field — among the Gallinaceæ. And speaking of obesity, what a blessing in disguise the depression is bound to be for those whose superabundant charms have a simple physiologic background.

1901 Continued

I recently had a long letter from Ellis Lawrence who has emerged from the educational debacle through which the state of Oregon has been passing, not merely as Dean of Architecture as he started but also of "Allied Arts," which includes apparently plain and fancy sewing and the use of the saxophone. This much, however, I think we may regard as certain, that, no matter what ravages state legislatures may commit, Ellis will never become a crooner, for which let us thank God. Phylogenetically they constitute a race apart and one can only hope that they face Mendelian extinction.

One result of my last circular in the Class has brought me a certain modest glow of pride in that several of the faithful have commented pleasantly on the thrift, approaching penury, which has maintained the Class finances in their present healthy state. Ellis Lawrence suggests funding our balance for the benefit of the indigent, while others put forward claims for benefit should such provision be made. I am sure, however, that you all realize that our present financial solidity derives from the generous contributions of the members of the Class who have supported it and me through thick and thin, particularly the latter.

Harry Allen of Maplewood, N. J., and 225 Broadway, New York, selling steam and electrical machinery, announces a son in Dartmouth who is headed for M. I. T. at some not far distant date. I find that more and more the men of our generation are seemingly regarding the Institute as a post-graduate school. There has certainly been a big change in the composition of the student body since we, as nurslings, were nourished by our alma mater. Even so, the school still remains dominantly an undergraduate institution, the development of the several faculties under the group of deans insuring continuance of the initial program while taking due cognizance of the needs of the advanced student. In a quiet way the Institute is continuing as a pioneer in educational matters as numerous educational experiments attest.

For the moment there is no further news in regard to the Reunion since the mere fact that we are to have one has lost its news value, while the program that it is to follow has not yet taken final form. I am starting in the near future on a brief trip to the Middle West, where I expect to see not a few of my classmates. With an ear always attuned to the wishes of the customers, I shall hope to bring back suggestions which it will be the privilege of the local group to render concrete. Cape Cod will undoubtedly be the scene of our gathering and as we have exhausted all of the housing possibilities except private dwellings — and with the nocturnal habits of some of the participants in earlier years I am not entirely sure even of this — we shall probably start the round revisiting earlier scenes with tender memories. With several well-known yachtsmen in the Class it seems rather a pity that we can not arrange an aquatic program and I am not sure that some steps will not be taken to furnish

bathing facilities at least in some of the sylvan stagnant pools deserted now, alas, by the thriving families of mosquitoes that formerly made them populous and tuneful. But I whet your anticipation — and this is only January. Next month, as I promised you earlier, I will give you an account of the Alumni Dinner which will embody an impersonal but critical review of the remarks of the presiding officer and such others of those present as may by accident find an opportunity to speak. With this grim future staring me in the face I pause to gather strength. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1903

Note is made that H. S. Baker, I, is an associate editor of a new construction engineers' handbook just out. Baker is in Chicago, and we expect we shall have some news to pass on to the Class before the next issue of *The Review*. — Joyce, V, who is at the Doyle Works of the du Pont Company in Leominster, Mass., wrote an entertaining account of a hard-won fight he had for reelection to the local school committee last fall. One of the qualifications his opponent stressed was that he was the father of four children of school age. Inasmuch as the salary going with the office is zero, Joyce thought it was not worth while for him to attempt to match his opponent on this point. Joyce won by three votes.

A grand letter from Farnham, XIII, was received during the last month, in which he gives his whole life history for the past 30 years. He has had a lot of advertising experience, mostly with New York City as his headquarters, had three years life on a farm in Connecticut, where he learned both what to do and what not to do, and went back to advertising. While at present somewhat of a "free lance," he still has yearnings to go back to the land. He noted in the daily press that Potter, VI, Dean of Purdue, addressed an organization in Boston lately. — Have also just received a pleasant surprise in the form of a letter from H. C. Crowell, I, who has stayed with his first love, the Pennsylvania Railroad, "the standard railroad of the world," ever since 1903. Starting at Pittsburgh, he was transferred to Chicago, and has gradually worked his way east again through Logansport, Pittsburgh again, Philadelphia, and is now in New York City, with chances good of coming back to Boston if the I. C. C. approves consolidation plans. Crowell recalled the old adage about rolling stones and moss, and adds that although the moss disappeared in 1929, "the distinguished service record prevented a complete debacle. Thirty years of seniority offset the accumulation of rust; they are worth more than the small amount of moss gathered." Possibly that 30 years is the moss referred to in the adage.

Speaking of 30 years, the Class please note that it was just 30 years ago this year that it started out to remake the world. The secretaries would welcome any suggestions as to the proper way,

place, and time in which to celebrate this great event. It won't come again, and it would seem that we should make the most of it. Send in suggestions so that plans can be started. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 89 Broad Street, Boston, Mass.

1905

From Frank Payne, XIII: "Just before the first of the year, I dropped in on Henry Keith, XIII, at Cambridge. I had not seen Henry for a long time and it certainly was a great pleasure. I felt, all the time I was talking to him, that I was addressing an Admiral in the Navy and that it did not seem right that a plain 'gob' should be sitting down slapping the Admiral on the back. Of course, this happened when the door was shut and there were no assistants standing at attention. I had a mighty fine visit with Henry and, in passing out of the lunch room we stopped, for a minute, to look at the youthful appearance of our Class as it was in 1905. Have you ever done that?"

"While I was in Boston, between trains, I tried to get in touch with Eddie Burkhardt, XIII. He was working on a customer for an order and his secretary sent out word that there was a 'Quiet' sign on his door. I was sorry to miss him. I spent a few hours with Ralph Segar in Westerly. Then, proceeded to Annapolis where some interesting developments of ours are being tested. I always love to go down to Annapolis. They have a wonderful testing laboratory now, in complete operation. Their new buildings and new equipment are the most up-to-date that money can buy, and it will represent many worthwhile savings to the Navy and also safeguarding many lives in the service."

Ed Burkhardt's son, Roger, was vice-chairman of Parley on Marriage committee at Wesleyan and helped put over an extremely interesting affair — especially interesting to those of our vintage. Bill Green's, VI, boy was another Wesleyan son of the M. I. T. and Al Prescott, II, said he was going to send his here last fall but he never arrived. On the other hand, we find that Grove Marcy, II, is a Tech son, and grandson, of Wesleyan University. Maybe others. — Ernest Schmeisser, VI, gives us Tom Pinkerton's, V, address as 605 Park Avenue, or 3501 Winterbourne Road, Baltimore. Not so bad to have two addresses these days. But Schmeisser sent no word of himself and that is too bad for we've had none in ten years.

From Sid Strickland, IV: "Andy Fisher, X, staged another little comeback at his Roxbury church the other evening. A young Tech professor by the name of Schwarz gave a most interesting talk upon experimental work being done upon weaving materials, and I went out at Andy's invitation and had the pleasure of eating Andy's quahog chowder alongside of Walter Eichler, II. Eichler does not believe that we will have any real Class Reunions until beer is returned.

1905 Continued

"Working upon my latest idea, *i.e.*, that of establishing hand looms for weaving at Plymouth, I went down to Woonsocket to meet the head of one of the big mills there and afterwards Andy, who chaperoned me, and I called on Prince Crowell, X. Outside of the entrance to the office was a sign 'No Help Wanted' and we were made to wait an indefinite period before we could see Prince. By the time Prince was ready, Andy and I had become so occupied in some transactions of our own that we weren't ready, so that he finally had to come out for us. We didn't exactly wreck the plant, but we had a good time nevertheless. I will say this for Prince and his organization, they have got something to do."

Norman Lombard, II, and Ted Steel, VI, have both apparently departed from their addresses. Can anyone say where they are — Fred Goldthwait's, II, Duro Pump Company is now located at 175 High Street, Boston. — A Christmas card from Ben Lindsly, III, shows photographs of his family in 1915 and 1932. Very interesting to your Secretary who knew both parents. — William P. Field, VI, may now be reached at 44 Carter Road, East Lynn, Mass.

In our freshman band, the littlest fellow played the littlest and noisiest instrument — Edward D. Perry, XIII, and the piccolo. At the old union, over the shops, he played the flute to Fred Pirie's, II, piano. Somewhere, recently, we have seen an old photograph of a commers (we thought it was spelled with a 'k' — is it a singular noun?) with these two in the center. What a team that was! Perry got lost. No word for years. Just now he bobs up in Waterbury, Conn., chief engineer of The Beardsley and Wolcott Manufacturing Company, makers of electric home helpers, drapery and upholstery, hardware and house furnishings. He writes: "I plead guilty to having been the chap with the piccolo. Probably the man whose name you have forgotten is Whipple or possibly Broad. I haven't looked at a piccolo for 30 years, but once or twice a year I try to make a noise on a flute. Not much success."

"Last Summer I attended the Tech outing down near Saybrook, but if you were there I didn't recognize you. A few years ago I played golf with a man and it wasn't until we reached the 17th tee that it was disclosed that we were both 1905 Tech men. Now I have forgotten his name." — ROSWELL DAVIS, *Secretary*, Wes Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1910

There seems to be a depression in class notes. Your Secretary thought that when 1910 notes appeared regularly it would encourage more of the boys to write in. There have been notes in every issue for the past three years but still almost no one writes to the Secretary except in reply to a special appeal and this month only one out of the ten men who received the appeal sent in a letter. The following

is from Lasley Lee of Columbus, Ohio: "Glad to get your letter. It was nice to hear from you. I enjoy reading your alumni notes in *The Review*. The Central Ohio Technology Club meets for lunch once a month at the University Club and always has a very pleasant get-together. I am still on the job with the U. S. Geological Survey in Columbus. If you ever come out this way, please look us up." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

You will soon discover, mates, that this issue of our class notes might well be dubbed *The '11 Literary Digest*, because during this first month of 1933 it has been my good fortune to secure copies of articles by classmates and to be now able to digest them for presentation here.

At last we are able to reward your patience and give you the salient features of the Share-the-Work Movement, which was inspired by The New Hampshire Plan of Harold M. Davis, I. Davis says this work-sharing idea is "a plan for solving as much of the unemployment problem as is due to the vast and sudden increase in labor-saving devices and to the lack of expanding new industries and foreign trade; further, as a temporary measure it may also be used to offset every cause of unemployment."

"Management," he continues, "having fostered the uncontrolled growth of the machine, leadership rests on management. Our obvious inability to handle this problem has a paralyzing effect on people and hence stalls all other efforts at recovery. Then too, job-sharing will increase purchasing power, because effective purchasing power depends as much on confidence in continuity of employment as on personal credit and money in hand."

Asked if it is not better to maintain high wages for some, even at the expense of total unemployment for others, than to spread out thinner the present volume of work, Davis replied: "No. As in public health, for some to be well all must be well. We suspect that sharing good and evil will increase the good and reduce the evil to be shared. Further, the cost should not fall exclusively on the wage-earner, since dividends and all salaries should help bear the cost of this universal benefit."

Davis believes that groups already at or below the subsistence level cannot be expected to share jobs, but are expected to work out a method by which they will in the future take on more people as their conditions improve. Groups which should shorten individual hours at once he groups as: "(a) Those with reasonable hours and wages; (b) Where business is falling off, work can at least be divided to retain as many as possible on the payroll; (c) If business is improving, new workers can be taken on instead of lengthening hours for those at work; (d) One or more busy departments in a concern otherwise on short time can share jobs."

"Further," according to Davis's plan, "a concern with no idle machinery or floor space can have people now working give up time and let others work, while a concern employing all its people full-time can share jobs with less hardship than groups hard hit. Job-sharing does not require new equipment and floor space and by balancing hours of leisure for those now employed against hours of work for those reemployed business costs and expenses are not affected."

Davis claims there is no standard method of job-sharing, but any group's method must be technically and economically sound if confidence is to be roused. "Assume," says Davis, "a tentative decision to add 10% more people to an organization. First work out the details of placing the new people in office or factory or store departments. The ratio of the new workers to those who can share will be one to seven or eight instead of one to ten. Decide how the equivalent leisure time is to be granted, make out a detailed schedule and tell each group how job will be handled. Next work out the cost, figuring perhaps lower rates for the new people until business picks up. Those who share time, perhaps 80% to 90% of the average group, will get at least one-eighth of their time off."

"There are several technically sound methods possible, but in most cases, teaming two people in half-way shifts for a full week gives each half-time off, but with nobody absent more than half a day at a time, and provides a vacant desk or machine for the unemployed person. Rotating by weeks through each group gives everybody a share of spare time, yet each change lasts an entire week as compared with a complicated schedule of days off for everybody every week. There are efficiency advantages in the short day — say for the 10- and 12-hour office and factory day with only five or six hours for people — overhead will go down, and fewer machines will be used up more rapidly and replaced more frequently."

In conclusion, Davis states that technicians can perform no greater service than in discussing the problems involved: job-sharing, rather than involving a permanently lower standard of living, is regarded as the first step out of the depression toward a higher standard; and its greatest obstacle, inertia — unwillingness to stop and think about the greatest human problem of modern times. This presentation was effectively brought about by our Don of Okonite, yclept D. R. Stevens, who sent me an article from the current (January) issue of *Factory and Industrial Management*.

Alf de Forest, XIII, of Bridgeport has now opened offices at 898 Madison Avenue, New York City, and 11 Rosemont Avenue, Pittsburgh, for the A. V. de Forest Associates, he being located personally in the New York office. He writes that he had the pleasure recently of spending a few days rambling around Technology, hunting up the familiar names and wondering what sort of chap carried the unfamiliar ones. "I soon

1911 Continued

found," he says, "that the pleasantly casual laboratory of Gordon Wilkes, II, afforded the best parking space for a classmate of 1911. In this laboratory the congenial old spirit of work and simplicity have been transplanted to the wrong side of the Charles River."

He adds that his latest gadgets have sales possibilities in the aeronautical industry and he is glad to find a few of "the Tech men of the right vintage still in the game."

In concluding, Alf writes: "The well-known depression is probably sharpening the wits of most Tech men. I wonder into what unexpected occupations they are roaming. With some surprise I find myself writing advertisements. How about everyone else?"

As evidence of his ad writing, Alf included the December, 1932, issue of *The Mainspring*, edited by him for The Wallace Barnes Company, Bristol, Conn. The major article, entitled "What Constitutes a Spring, When All Materials Are Springy?", is intensely interesting, going back to siege operations earlier than 800 B. C. in the Roman Empire to the siege of Constantinople in A. D. 1453, which latter event marked the fall of the Eastern Empire and the beginning of the Renaissance.

He also included an article by himself in the November, 1932, issue of *Research Laboratory Record*, entitled "A Novel Recording Strain Gauge." This is a description of his own "deForest scratch extensometer," devised for the Autogiro Company of America, when this organization wished to know the bending and direct stresses in the rotating wing spars of their "flying-windmill." This device produces a full-size record of the strain in the member to which it is attached, thereby eliminating optical, mechanical, or electrical systems of multiplication of motion.

Another leaflet enclosed described another of Alf's devices, Magnaflux, an inspection method for use in locating defects at or near the surface of steel and its magnetic alloys. The part to be inspected is first magnetized and then either rolled in a box of Magnaflux Powder, or the powder is dusted on by means of a container with perforated openings. When the part is tapped or shaken the powder all falls off, except where there is a flaw of the type sought after.

Joe French, IV, is now located on R. F. D. 2, Concord, N. H., having returned from Russia in mid-1932 at the expiration of his architectural firm's contract (Albert Kahn, Inc.), not accepting a proffered separate one for himself. He says he still may go back if the depression lasts too long. The University at Moscow wants his course headed by himself, instead of the present usage of his textbooks without him until his hoped-for return.

"I had," he writes, "money invested in my brother-in-law's farm here in Concord, so I took up my half-interest in an effort to rest and build up the farm and myself. These 21 years of continuous work since we left Tech have never given

me a chance to really take care of my hobbies. So now I am writing my books and have given several lectures on Russian Art, built up this chicken ranch to 1,200 layers, and altogether put in a very strenuous four months to close 1932.

"Most important, I now have a son. Yolanda gave us a boy on the 5th of December so now I have an heir — four girls and at last a boy. Now we are satisfied. Say, do I have the record for 1911 with five children — oldest 19, youngest about 4 weeks?" Speak up, maties, if there be any who can beat this record!

Tommie Haines, VI, has a paper with a fellow Edison employee, E. F. Robinson, in the *Electrical World* for January 14 on "Economic Benefits of Scientific Line Clearing." Tommie, you know, is superintendent of the distribution department and Mr. Robinson is a distribution engineer of the Boston Edison Company, with which organization Tommie has, by the way, been connected since graduation.

The opening paragraph (Tommie clearly having remembered Arlo Bates's teachings) gives a clean-cut picture of the main theme of the article. Read it: "Five years of scientific line clearing on the Boston Edison system has decreased service interruptions, reduced safety hazards due to fallen wires, lessened reports of interference with radio reception, and practically eliminated complaints from property owners. Measured in units of wires down per 100 street-miles of lines per year due to trees, the past five years' operations show a decrease of from 14.3 to 5.9, or 59%. The total cost of line clearing in 1927 on 1,900 miles of streets was \$115,505, whereas this was cut to \$104,221 for 2,111 miles of streets in 1931. The use of tree experts has played a vital part in attaining these results."

The 250,000 trees are classified "roughly as 45% elms, 25% rock maples, 10% Norway maples, 5% silver maples (soft), 10% oaks, and 5% miscellaneous, consisting of hickories, pines, poplars, and very few spruce. The trees in general are large and matured, the greater part of them having been planted by the early settlers of the 40 municipalities, embracing 650 square miles. As a result of the beauty, history, and sentiment attached to these 'first citizens,' the average New Englander is conservatively and extremely 'tree-conscious'."

Before the fall of 1926 all tree trimming was done by linemen, but at that time tree experts of a national tree surgery organization were assigned to clear the lines in one city. This was successful and in a short time three companies had representatives in the field. It has been clearly shown that such a scientific, organized method of line-clearing by specially trained experts has obtained "(1) only the necessary clearance, much of which would be permanent, at a minimum of cost without sacrifice to the trees and (2) a direct improvement in public relations as a result of higher standards of service and the improved conditions of the trees."

The article goes on to present graphically the reductions in wire troubles from trees, gradually diminishing costs per street-mile, and improved service as system experience lengthened. The tree service companies are required to carry the customary forms of insurance and adhere to the same safety-first rules that apply to the utility's men. Continuing, "it has been discovered that trimming on a two- or three-year frequency, as conditions demand, produces the best results, with crews composed of a foreman, six climbers, a combination truck driver and groundman and, in a few cases, another groundman. Each tree is considered an individual problem."

Bancroft Hill, I, has been engaged in compiling a composite index of business activity in his native city, Baltimore. The index has created wide interest among business men there and the Baltimore Association of Commerce in December published a reproduction of the index to date together with a descriptive article by the author. Ban says this index was prepared at the behest of the Commission on Governmental Efficiency to aid in their solution of the problem of the future tax rate of the city, this index giving a pretty direct measure of the future ability of the taxpayer to pay. The four factors Ban used were: traffic activity, manufacture, construction, and purchasing power of the people.

Bill Shepherd, VI, has gravitated from Akron, Ohio, to 919 Barrington Road, Grosse Pointe Park, Mich. (a suburb of Detroit). Bill is delighted at the activity of the Tech bunch there, Minot Dennett, II, continuing to be a big factor in the club activities. Bill has been connected with a Detroit firm of consulting and industrial engineers and he has been specializing in new layouts and rearrangements of tire plants, in which line of manufacturing he was engaged while in Akron. The work has now run out and things are very quiet, Bill says. He is firm in his belief, however, that when better times start back, Detroit will recover quickly.

Frank Stibbs, XI, is still agent in Southern Connecticut, with headquarters in Waterbury, for Automatic Burner Corporation products. He writes that he has recently taken on a side-line of wrist watches on a chain basis.

From the "Cooley Greeter" Christmas edition we learn that Lloyd Cooley, X, and his wife are now at 1540 East 66th Place, Chicago, while from Houston, Texas, we learn that George Forristall, II, is now publishing Houston Shopping News from an office on the third floor of the Great Southwestern Building in that city.

It has been a lot of fun preparing these particular notes and your scribe's earnest hope is that you and you and you will so enjoy reading these notes that it will at once prompt you to "write to Dennie!" and in the writing please note that my good wife and I have decided, in order to better designate its attractive location, to change the name of our hostelry, Douglas Inn, to Douglas Hill Inn, Douglas Hill, Maine. This winter we are lumbering in

1911 Continued

our own woods — a great, outdoor life! I'll be hearin' from yer! — ORVILLE B. DENISON, *Secretary*, Douglas Hill Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

From B. H. Morash, VI, comes a little note, cheerful even though very brief. He says: "... am still selling locks and there is some business and fair prospects ahead. It takes much digging but we don't mind that." He adds that he is feeling fine again, which is good news. Morash is Sales Manager of Dudley Lock of Canada, with office at 1 Sheppard St., Toronto.

Our good friend, Dennie, general Secretary of 1911, again comes to the aid of the 1912 Class Notes, this time by sending us a newspaper report of the construction of the new fireproof Rindge Technical School in Cambridge, designed by our classmate, Ralph H. Doane, IV. According to the newspaper story, Doane's design was so practical and so well done that the \$1,500,000 structure has been completed within a working period of about nine months. The building embodies the most advanced and substantial methods of construction, materials, and facilities for technical education.

The general lack of news would seem to show that the Class as a whole was suffering from writer's cramp rather than the prevailing epidemic of "flu" which has laid your Secretary low for the past ten days. We are hoping that the spring weather will bring complete reports from the outlying territories. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1913

Word has just been received of the death of Guy Buchanan at Westfield, N. J., on January 21. The following lines are taken from a Claysville, Pa., paper, Buchanan having spent his early life there: "Mr. Buchanan was a son of the late E. T. and Clara Hodgins Buchanan and was born in Taylorstown. When he was a small child the family removed to Claysville, where his early life was spent.

"He was educated in Claysville schools and Washington and Jefferson College, graduating in the Class of 1910 with *magna cum laude* honors. He then was graduated from M. I. T. in 1913, remaining for a time as assistant professor of chemical engineering. During the World War he was connected with the Army School of Chemical Engineering. He was one of the leading chemical engineers of the country and had been connected with several large corporations, being frequently sent to Europe for research work. At the time of his death he was in the employ of the American Cyanide Company. He was a member of the American Chemical Society and of the Presbyterian Church.

"He leaves his wife, who was Miss Elizabeth Hawkins of Washington, and three children."

Joe Mackinnon had a phone call from Phil Capen the other day relative to a reunion this year. Capen had seen Gil Pardey only recently and their conversation had gravitated toward the possibilities of a reunion. Everyone admits that this year is no time for a gala occasion, but perhaps some modified affair might be planned. Bill Brewster at the last Alumni Council meeting expressed himself in a similar view. No doubt other classmates have ideas on this reunion matter, and the officers would appreciate receiving such opinions. Send in your ideas right away, as the time between now and June is getting shorter than most of us realize.

I talked with Phil Terry over the phone the other day on both official and personal business. He admits business is just around the corner, and that he has caught up with it at various times. He promised to come over and see us before long. — GEORGE P. CAPEN, *Secretary*, 50 Beaumont Street, Canton, Mass. ARTHUR L. TOWNSEND, *Assistant Secretary*, Room 3-435, M. I. T., Cambridge, Mass.

1914

Those outside of Boston will be interested in learning what we are doing here in regard to the monthly luncheons. Because of the general economic situation it seemed inadvisable to continue these luncheons. We also felt that with the number of engineers in need of help that it would be far better for funds to be spent that way than on an annual dinner. The need of getting together is, however, greater than ever. In view of the fact that the Alumni Dinner has been returned to a stag affair, we used this dinner as our own Class Dinner. This method was planned to get out more '14 men for the Alumni Dinner and save all of the expense of running an additional dinner. In order that there might be an opportunity for the Class to get together by themselves, we arranged for an afternoon meeting starting at four o'clock, to be adjourned in time to attend the Alumni Dinner. Perhaps this same arrangement can be worked out in other cities.

Chet Corney has forwarded a letter received by him from Y. M. Chu. For the past ten years Chu has been with the Kwang Tung Electric Supply Company, but since the first of the year has become distribution engineer with the Shanghai Power Company, of Shanghai, which is controlled by the Electric Bond and Share Company. Chu writes that the Shanghai Power Company has a generating capacity of over 200,000 Kw. and has a peak load even under these times of over 80% of the total capacity. Through its substations the system serves the Shanghai foreign settlement.

Hats off to Thorn Dickinson! In the midst of troubled times we find him leaving his engineering activities to become Treasurer of Calhoun Colored School at Calhoun, Ala. This school, well known

in Boston because of prominent people there who have sponsored it, was founded years ago by an aunt of Dickinson. Due to the recent death of this aunt, who was principal of the school, and to the financial strain caused by the depression, the school faced a real crisis. At the request of the Board of Trustees Dickinson left Boston and went to Calhoun to become Treasurer of the school to help reorganize it to meet current conditions. Dickinson hopes his work may be completed this year so that he may return to engineering next year. One of Dickinson's side activities at the school is the direct supervision of \$25,000 allotted to the school for road building.

To those who are not already familiar with the Calhoun School it may be stated that it is one of the very successful attempts to have negroes improve not only their own conditions but those of their state as well. Calhoun is located in a district where negroes outnumber whites, like Bryan's silver ratio of 16 to one. Here negroes are trained to become farmers and are helped acquire farms. It has developed a land lien, almost bondage system into a useful community. Other trades are taught, especially for the girls. For those going on to higher education, there are college entrance preparatory courses. Located in the district in which it is, the school started under a distinct handicap of suspicion from local white landowners, but after 40 years of useful existence this suspicion has been replaced by admiration and support. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1916

Your Secretary was pleased to receive the following newsy letter from his Providence correspondent: "Concerning Sal Makepeace, we can only say 'no news is good news'."

He apparently leads the normal life of a young business executive, absorbed in his work and his family, like most of the rest of us. We understand that although his golf has brought him a prize or two in the past, his main outside interest lately has been in sailboats, both racing and cruising. He is immensely proud of his twin boys and although not the only one in the class of 1916 who is the father of twins, he does emphatically claim to be the first 1916 man to have this distinction.

Arthur and Walter Stewart have made good in the Rhode Island textile industry and both hold positions as superintendents with the Lonsdale Company whose mills are among the best known in the country. Arthur runs the Berkeley and Ashton Mills while Walter manages the Ann and Hope Mill, and they are both to be congratulated in the judgment and discretion they have shown during one of the most trying periods in the entire history of the industry.

Walter has recently taken unto himself a wife and is open to the congratulations of the Class. He is apparently one of the

1916 Continued

last of us to succumb but has at last seen the error of his ways and has done something to remedy the situation. We regret to report, however, that only a very few days after his return from the wedding trip, a disastrous fire ruined the interior of his home in Lonsdale, and Mr. and Mrs. Stewart were obliged to take up their residence elsewhere minus many of their house furnishings and a good portion of their wardrobes. Walter remarked that it was rather a strenuous "housewarming" and we are inclined to agree with him.

Ed Parsons is still the mechanical superintendent at the American Electrical Works and seems to be bearing up well under the heavy responsibility of his job. Ed's main interest outside his work is his big yawl *Sea Witch*, which he has sailed in the famous Bermuda Race and other ocean racing events. So far we have not seen his boat listed as winning any great number of first prizes but that cannot be because of any lack of skill on the part of the skipper. We had a sample of a famous Bermuda product which Ed procured after last year's race and if he can bring home anything as noble as that, some other boat can have the prize cups as far as we are concerned.

The Pacific Coast seems to be a most desirable place as is evidenced by the following from Flip Fleming: "I am now located in Los Angeles, Calif., in charge of the Goodyear Tire and Rubber Company's factories located at 6701 South Central Avenue. My home address is 2632 Raymond Avenue, Los Angeles. I am here for an indefinite time, but not for good. We have been here for a period of two months and as soon as I have an opportunity I will get in touch with the Technology Group of California. I have already received a card from them.

"My whole family have been having a wonderful time since we arrived. We have been taking in various football games, the game between Southern California and Notre Dame and the one between Southern California and Pittsburgh on New Year's Day, and also saw the Tournament of Roses Parade in Pasadena.

"The weather has been very wonderful, although we have had some rain and a sand storm and some cold weather. I don't feel about the weather in California like the newspapers, but it is very nice, when I get word from home and see that there has been zero and below zero weather with lots of snow and ice. We are going to enjoy it here immensely. Give my regards to all my friends in Tech."

Marshall Wellington has been spending his leisure time in small boat sailing on Long Island Sound. He writes as follows: "I suppose you would like some news to insert in the 1916 notes of *The Technology Review*, but I am afraid that I am unable to give you any of interest. My work goes on the same as ever, my family is growing up as all families will, and the few 1916 men that are in this district I very seldom see. I shall extend to you, as I have already done, and to any 1916 Tech men who happen to be in this neighbor-

hood a most cordial welcome to come and see me. If they are in this vicinity in the summertime and desire a swim, I shall be very glad to see that they get one."

— HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass.
CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

Prompted by the doleful musings which Secretary Stevens set down as the '17 notes in the January Review, President McGrady appointed several independent commissions, all of which were to probe the claims of the Secretary that Technocracy, or some similar blight, had prevented his receipt of news from classmates.

After a series of painstaking investigations, these commissions have unanimously reported to President McGrady that Secretary Stevens possesses all the natural attributes and acquired inhibitions which make it imperative that he continue as Secretary to chronicle the affairs of this Class. They do not favor a New Deal for 1917, and, instead, believe emphatically that the appointment of any assistant secretaries would permit the Secretary to libel members of the Class at will, meanwhile alleging that such slanders were due to the machinations of an alter ego.

All the Commissioners report themselves as satisfied that the quality of the notes have been eminently satisfactory. This was but natural, they say, in view of the Secretary's early experiences in the editorial rooms of *The Tech* when he was press agent for the late Tech Show. It will be remembered that while Ray occupied this exacting position he began to reef his hirsute tops'ls. His later and much more creditable journalistic outpourings, as Editor of Dr. Little's *Industrial Bulletin*, have served to doff last vestiges of canvas trim from above his widening forehead. It would now be difficult, if not impossible, for a casual observer to conjure up a vision of the full-figured Ray Stevens of 1913-1914.

To continue the metaphor, however, as one of the Commissioners so aptly phrases it, the Stevens ship has turned from sail to steam and must have installed turbo-electric quadruple screw propulsion machinery. Its speed and reliability have thereby been markedly increased, for the boilers are sound and the hull has benefited from time to time by the application of many of the new synthetic resins and other advanced technologic derivatives produced by the labors of earnest fellow-workers of the Little organization.

Then, too, Ray has not overlooked other advances in naval engineering. His form now exhibits some of the more commodious attributes of modern liners, such as special sun decks and veranda cafés, and a trace of a bulbous bow. His beam has increased and so has his draft and, if it were at all necessary, the Commissioners are sure he would install gyro-stabilizers.

All members of these various commissions agree, therefore, that the present Secretaryship is decidedly a seaworthy vessel, and the only difficulty is that on the bridge there is a mild case of "self-nocracy." Reduced to simple terms, this means a lack of cargo and a diminished passenger list.

It could hardly be expected that the one-sided correspondence which Ray has conducted with so many members of the Class would fail to get on his nerves. His day-to-day responsibilities as an expert on plastics and paper mill problems, and on a multitude of other allied chemico-industrial projects, which are constantly being picked apart to have their ticking examined in the Little laboratories, have contributed to his worries. Also his responsibilities as Chairman of the Northeastern Section of the American Chemical Society, as a working member of the hierarchy of the Alumni Association — he has served on its Executive Committee — and his domestic obligations, which have occasionally been complicated by chicken pox (and mumps), weigh heavily.

All the Commissioners feel that he may be restored to good spirits if members of the Class recognize that postcards are still carried for a penny by the United States mails, and that the modest expenditure of a nickel by visitors to Boston is likely to establish telephonic communication with his office. These simple remedies, if adopted by only a modest proportion of the Class, will solve Ray's problem and it is the wish of President McGrady, on whose behalf this statement has been drawn by an anonymous member of the Class, that the suggestions be put into effect. — (Signed) E PLURIBUS UNUM.

Listed under the heading of waterfront news, the *Boston Globe* for December 30 cited the names of a few distinguished passengers who embarked at Boston on the Canadian National Steamship *Lady Drake*, for a four weeks' cruise to Bermuda, the Windward and Leeward Islands, and British Guiana. Outstanding among the passengers named was Professor H. E. Lobdell of M. I. T. Other interesting heavy cargoes listed included rubber and fruit.

Claudius Henry Mastin Roberts traveled up to Ottawa last summer and presented a most scholarly paper at the Colloid Symposium held there. His title was "A New Theory of Emulsions" and anyone interested and able to understand the physical and colloid chemistry involved may obtain reprints by writing the author, care of the Petroleum Rectifying Company of Los Angeles. It now remains for C. H. M. to build a house, for in addition to the work on emulsions, he reports that a son — Samuel Adams — arrived in May, 1932. Samuel Adams' sister, Patricia, is now three years old.

Presumably as a result of the earlier suggestion of your Secretary that other contributors to these notes be approved, your President, Leon L. McGrady, made a hurried trip to Boston recently, so hurried that he apparently had only time for a brief conference with the class repre-

1917 Continued

sentative on the Alumni Council, Professor H. E. Lobdell. We gathered that he took advantage of the trip thus made necessary in order to attend to some important personal matters at the same time.

Frederick Bernard came in to the Secretary's office in the same connection but immediately forgot his errand in reporting a recent view of Judge Doon standing shivering on the sidewalk waiting for a bus. According to our informant, the Judge looked entirely human and not at all like a dignified bewigged dictator to juries. Mr. Bernard delivered an interesting extemporaneous lecture on the use of leisure time, citing Judge Doon as the perfect exemplar of the art. It seems that in Henniker, manufacturers of bicycle rims had leisure time even before the present era.

Dudley Edwards Bell was in Boston not long ago but he telephoned, was taken for somebody else, and immediately left town in disgust. This item should have been inserted previously but there was no written record of his visit and it took an ad on a Philadelphia billboard, "Ball Bearing Hammocks," to remind us of the omission.

In a very brief stay in Philadelphia, we ran into Rene Pouchain directing the new development activities of the Tasty Baking Company, large factors in the soft cake industry. He seems happy and from what his associates reported is doing effective, constructive work.

Joseph Gargan contemplates winding up his manufacturing activities in Peabody for reasons that Messrs. Schwab, Swope, Sloan, and others will understand, complicated by certain factors peculiar to the pleasant little game of making shoes. Among the few that are riding high, wide, and handsome in that highly competitive industry is Robert C. Erb, recently made Treasurer of the J. F. McElwain Co. and still able to keep most of his factories running. Prices apparently are figured with seven place logarithms to avoid errors in the minute fractions of a cent representing the difference between profit and loss and the last degree of refinement has been adopted in the production line.

The following has been received from Ken Bell: "Pursuant to my promise, I'm giving you the low-down on such '17 men as I can. Paul Woodward, breaking a silence of some years, sent us a newsy Christmas letter. His family (Barbara, nearly seven; Shirley Anne, five; and Consuelo, three) and the management of Viscose Company's Parkersburg, W. Va., plant keep him busy.

"I saw Barney Dodge, King Gillespie, and Dave Pierce in Washington during the American Institute of Chemical Engineers' meeting early in December. Barney is head of the Chemical Engineering Department at Sheffield (as well as author of some excellent articles on high-pressure reactions which have appeared recently).

"King Gillespie handles the technical work of the Stamford Rubber Company in his home town of Stamford, Conn.

Dave Pierce is chief engineer from Rohm and Haas, manufacturing chemists of Philadelphia.

"I rode back to Philadelphia with Dave and Mrs. Pierce in their LaSalle, leaving Washington at 11 at night and arriving at Dave's house at four in the morning.

"The next day I saw Dean Parker, who is in the Paint and Varnish Research Department at the du Pont paint works at Gray's Ferry. Dean has four children like some of the rest of us. (*Sic.*)"

By the way, we let Bill Ryan have his picture taken with us '17 men. It came out well, but he made me promise not to show it to Lobby—I should say Dean of Students Lobdell. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

During ye olde mid-year exam period your scribe journeyed Manhattan-ward in search of news, which he found a-plenty. Malcolm Alfred Launcelot Eales, prince of epic poem and local unemployment relief, arranged a round-table banquet atop an armorer's smith shop, to which galloped Sir Fuller, Sir Robinson, Sir Harrall, Sir Rowe, and Sir Granny Smith, beside Sir Launcelot and ye scribe.

Sir Granny, one of the few remaining aviators who has not yet flown the Atlantic, admitted to a fast trip last summer across the continent and back in his Avro Avian, and volunteered to take the class up at reunion next June, providing we buy the gasoline. Eighteen miles to the gallon was the figure quoted, but comparing this with the statistics on our 1921 Studebaker, we believe the figure largely for going down hill. Last summer Sir Granny was going to fly on an investigation of the gold fields around Great Bear Lake, but the project did not come to fulfillment.

When questioned as to the effect of Cal Coolidge's death on the life insurance business, Sir Rowe remarked that Cal carried only a small policy but was really only a big talking point. The knights, esquires, and pages are reminded that Cal worked for the New York Life, whereas Sir Rowe saves money for the Metropolitan Life.

Sir Harrall reported that domestic felicity which we all wish for him and unwittingly gave away his condition of servitude by displaying hands which much resembled those of the neo-lady in the advertisements whose fingers are poised tentatively above the dish pan.

Sir Robinson refused to be quoted, but Sir Fuller admitted having had the hole in his roof fixed. Sir Launcelot was all puffed up with having raised \$130,000 for unemployment. His method was to ring door bells and endeavor to extract \$1.50 (no tips) contributions without being unhorsed completely and tilted down the stairs. This achievement compares favorably with that of Mrs. August Belmont who raised \$13,000,000.27 in an afternoon by calling Mrs. Vanderbilt on the telephone and penning a note to Mr. Morgan, cruising off Gibraltar.

THE TECHNOLOGY REVIEW

News of the other brethren includes Ken Reid's trek to a more palatial office (no increase in rent) at 330 West 42nd Street; Bill Foster's absence on an 18-day cruise (nothing said about 18-day diet); and Mike Mally's complete disappearance. Anyone knowing his whereabouts kindly notify ye scribe or Scotland Yard.

Sir Launcelot tried to get us to print the story of how Sir Fuller was at his home not long ago, asked for a push to get his engine started, and eventually was towed all the way home, remarking, "I meant to put some water in that battery last year." But when ye scribe came to return to New York after an invigorating evening with Sir Launcelot and his lady, ye scribe felt sure the story was a bit mixed. The battery of Sir Launcelot's gallant Willis Knight refused to start ye engine and we walked. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-134, M. I. T., Cambridge, Mass. GRETCHEN PALMER, *Assistant Secretary*, The Wilson Road, Rowayton, Conn.

1920

At the annual gathering of Course XV on New Year's Day the following members of the class were on deck. Heinie Haskell, the woolen and worsted magnate; Jim Gibson, the noted realtor; Perc Bugbee, famed fire prevention authority; Mal Lees, investment banker; Bud Cofred and Albion Doe, business tycoons. At lunch on that day several of us had an impromptu class meeting at which each vied with the other to see who could tell the tallest depression story.

Ken Akers was to have been there but we understand he came down with the mumps. He is now completely recovered, we are happy to state.

Harry Blount has recently moved to Winchester and is now with the Equitable Life Insurance Company. He had formerly been with J. G. Blount Engineering Company, builders of machine tools. Charles Carleton's new address is 159 Sayre Street, Elizabeth, N. J. We learn that Dolly Gray has left New Orleans and other western points and is back in New York City where he may be reached at 100 East 42nd Street. Ed McCarthy is with the Gamewell Company at Newton Upper Falls. William Moy-Ding is in Boston, address 19 Harrison Avenue. Alfred W. Peterson of Course XIII has come back to these parts from Porto Rico and is now in North Hanover, Mass. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1923

Here's some definite dope on the plans for our next summer's reunion. President Bob Shaw has appointed a general Reunion Committee, headed by Lem Tremaine. Other members of the committee are, Bob Shaw, *ex officio*, F. P. Squibb (President of the New York Club), Ed Thimme, Dick Kleinberger, and Assistant Secretary Pete Pennypacker, to whom we are indebted for the information. This committee has given possible plans some real study, and has set the week-end of

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June 17 as a date and has decided to stage the foregathering somewhere in Connecticut.

The geographical distribution of the class makes a point midway between Boston and New York an appropriate location for the Tenth Reunion. The date may possibly be due for some change if there is difficulty in obtaining suitable accommodations on that date. There will be more dope later which may be sent out in a general bulletin to the class, perhaps before these notes appear. In any case, be looking for it, and let us hear from you promptly.

Because he doesn't like *The Review* cover designs, I have a letter from Malcolm L. Carey, III. He tells what he has been doing as follows: "I started working for the Aluminum Company of America at their Massena Plant in Northern New York. After having learned something of the process and its technical control, I was transferred to a new large plant then in process of construction at Arvida, Quebec. The starting of this plant presented the usual difficulties, and some unusual ones. Ten hours a day by all hands, eventually levelled the mountains, then smoothed out the wrinkles, so that in a few months things were running fairly well. This brings the story up to about midyear 1927. At this time we were beginning to have more time for experimental work and general efficiency improvement. During this stage I kept accumulating responsibility until I became a combination general foreman, process control supervisor, and what have you.

"In 1928 I was married. We now have two children, a boy going on four years old, and a girl between two and three years old. Between Old Man Aluminum and the home fireside, my days are full. In the fall of 1930 there was a general staff reorganization in the Aluminum Company of Canada. Among these changes I was transferred to the Shawinigan Falls Plant where I am now Assistant Superintendent. My new duties are quite different in many ways, but not less interesting.

"Coming back to the cover on the January Review, I wish to express myself. Of course, I don't expect to see a head-and-shoulder photograph of Santa Claus on the December number, nor a form sublime on skis for January, but with so many beautiful engineering structures to draw from, why show a coil of rope, or a blank steel skeleton? I ask this, realizing that these pictures were admirably composed and show wonderful photographic technique. — I want to take this opportunity to wish all my old classmates a happy, prosperous New Year." — HORATIO L. BOND, Secretary, 195 Elm Street, Braintree, Mass., JAMES A. PENNYPACKER, Assistant Secretary, Room 661, Eleven Broadway, New York City.

1926

Lucien R. St. Onge has written as follows: "Not much to say about myself, still hanging on at the York Ice Machinery, Boston, in the erecting department. In spite of the depression, we man-

aged to sell the Institute a refrigerating plant last month to be installed in the steam laboratory in connection with the experiments on cavitation.

"Here's an item of interest about a '26 man, J. V. Masterman, who was branch engineer at this office until recently, when he was transferred to the Brooklyn office to act in the same capacity there. He has just announced his coming marriage on February 11 to Miss Hazel Peterson, of Everett. This budding romance began when she joined our office force last spring and might have gone on indefinitely had not fate intervened. Upon his transfer to Brooklyn, friend Masterman decided he could no longer live in a state of single bliss. That's all for now."

We are grateful to Arthur W. Baker who is with Compania Mexicana de Explosivos in Mexico, for the following information about himself and family: "Am still working for the outfit whose name appears above. We have had an addition to the family recently and now have two children: Arthur Frederick, born September 14, 1930, and Phyllis Carlota, born November 22, 1932. Both were born in Toireon, Coah."

Lynn Wetherill is with the Transformer Engineering Department of the General Electric Company at Pittsfield, Mass. — James S. Woodward is with the Aircraft and Marine Engineering Department of the General Electric Company at Schenectady, N. Y. — J. RHYNE KILLIAN, JR., Secretary, Room 11-203, M. I. T., Cambridge, Mass.

1928

Baij N. Gupta of Shikohabad, India, a renowned occupant of the dormitories and well known among '28 men, has been working in Belgium since leaving Technology. He has now returned to India and will renew his engineering work there. — Dick Proctor, IX-B, formerly with Westinghouse in Pittsburgh, is now associated with Westinghouse in Springfield as refrigerating engineer.

Big, but tragic, among the happenings to '28 men recently was the early morning fire on December 17 which destroyed the home of Joe Parks, II, on Caramumba Road, Roslindale, Mass. The fire started at 4:30 a.m. from an oil burner in the cellar. Joe was on the third floor and when awakened he found the floor so hot it burned his feet. He was forced to go out the window on to the veranda roof, then to the ground. Mr. and Mrs. Parks had to tumble out of the second-floor window with the weather at two degrees below zero, both practically suffocated. At the time of the fire Joe's father was convalescing from an automobile accident. In trying to help his parents, Joe lacerated his right arm which later became infected. Add to all this the severe burns and broken arm (in four places) which Mrs. Parks suffered in the fall and you will get a strong realization of the tragedy. Over the holidays Joe and his mother and father were all in the hospital. Today they are all recovered and located in a new home (without an oil burner) in Milton. We congratulate Joe and his

family, and particularly Mrs. Parks, on their real heroism in coming through this terrible fire and starting over again. During the past few weeks, Bill Carlisle and I have been privileged to have Joe stay with us at '28 headquarters, Suite 537, 420 Memorial Drive, Cambridge. During that time we have had small class reunions quite frequently.

The Boston *Transcript* printed an article very recently describing a new trip which Lou O'Malley is taking to Mexico. This article states that Lou was recently issued a U. S. Patent for a new method "on selective separation of ores" which is claimed to be a 15% improvement over present flotation methods. We understand also that O'Malley has been negotiating with several Mexican gold and silver producers and that he also expects to introduce his system to miners of lead, zinc, and other minerals.

Our old friend Dempe, or Mr. Dempe-wolf, if you prefer the full name, has been through the Central American and South American tropical section recently and he says he is indebted to the natives of that section for a new appreciation of how to enjoy life. Dempe is now very busy trying to push Bradstreet's weekly magazine "from kindergarten through college in three months" — in other words, he is promotion manager. Here's luck to that accelerated educational growth program, old boy!

Jack Chamberlain is now serving a surgical internship at Strong Memorial Hospital in Rochester, N. Y. He cheerfully remarks that the long pull to become a doctor has still a few years to go. Thanks for the kind greetings, Jack, and we all wish you highest success in your surgical work.

Rube Schuler has been under the Standard Oil banner since graduation, first with S. O.'s Development Company at Elizabeth and now in the chemical laboratories of Stanco, Inc., manufacturers of Mistol and Nujol. — Myron Helme is now employed as electrical research assistant with the International Business Machines Corporation. We are also pleased to announce Dutch's engagement to Miss Elsie Lettan of Spotswood, N. J. — Jerry MacGillivray reports that his young daughter is fine and bouncing on her way to be a young woman. Jerry is still at the sales and contact work in Pennsylvania, New Jersey, Maryland, and Western New York for the Franklin Process Company which builds and sells dyeing machines, cotton yarns, and does all sorts of commission yarn dyeing in their plants. His letter sounds cheery and from it I judge business is still moving in good shape.

Vernon Brown has sent in an interesting account of his trips and shore leaves through the Spanish-speaking countries of Central America in quest of bananas. On one of his recent cruises he met Bolanos, working as steward of the boat and Grondel among the passengers. Regarding them he says: "Bolanos was a god-send when we went ashore in these ports and since he knew about all our ports of call, he was our guide. Grondel

1928 Continued

left us at the port of Cristobal and Bolanos went up into the mountains to his home at San José when we stopped for the bananas at Port Sinon, Costa Rica."

Henry La Croix has recently moved to 629 Parker Street, Newark, N. J., but outside of his best wishes, we have no additional vital statistics regarding him to pass on.

Our Fifth Year Reunion

Several fellows have already spoken of our Fifth Reunion which is due this coming June. The '28 gang in Cambridge have already had several huddles on the subject. We have several plans lined up which are now being checked into very thoroughly. In a short time we expect to have something very tangible and attractive to offer, a reunion week-end that will be different from anything done before and at less money.

Twenty-Eight has consistently shown higher Alumni response percentages on various events than sister classes and we all want that position maintained.

During the next few months Ralph Joep and I would count it a great favor if you will drop us a line and give us any ideas or suggestions which you have about our big five-year get-together coming in June of this year. Some of you fellows haven't written us a line in five years. Here's the big year. Let's hear from you. — GEORGE I. CHATFIELD, General Secretary, Room 11-203, M. I. T., Cambridge, Mass.

Course I

I am going to start by encroaching on the property of the Secretary of Course XI. While reading the roto section of the *Herald-Tribune* a couple of weeks ago, I was roused to complete attention by a picture captioned thus: "When Professor William Beard, at California Institute of Technology, makes addresses, he is introduced by his own robot which makes a short phonographic speech." In the picture was Bill, as natural, if not as big, as life. Beside him was his robot, a creature of his own making, some three feet high and formed mainly from hollow cylinders for legs and body, an oil can, two funnels and a telephone mouthpiece for a head, old shoes and gloves for feet and hands, and a phonograph for a voice. The last news of Bill was duly recorded in these notes nearly two years ago. He went to California Tech in the fall of 1931 to teach government.

To continue on Course XI, I saw Kleggerman a few days ago. He is still with Alexander Potter, 50 Church Street, New York City. — I know, too, that Mike Cohen is still in Brooklyn with the Carlson Company on subway construction. That leaves Norm Estes as the only missing member of the Course. Anybody know where he is?

George Mangurian was in town for a couple of days but was so busy that Hal Porter and I could see him only for lunch. George is still designing airplanes, care of Chance Vought Corporation, East Hartford, Conn. He told me of meeting Pop Robinson last summer, still in Troy,

N. Y., with the Bureau of Public Roads. He also had heard the rumor that Tony Fleming was married. Perhaps Tony will write and verify or deny the fact.

I was much pleased when Ken Clark sent a short note with his Christmas card to say that he was working for S. A. Healy, contractor on the Mississippi Lock and Dam No. 15 at Davenport, Iowa. He promised a longer letter which arrived yesterday. Ken's address is 1926 Belle Avenue, Davenport, and his history runs like this: On February 1 of last year the Sanitary District informed Ken that due to lack of funds, and so on, his services were no longer required, effective January 31. S. A. Healy was contractor for a battery of Imhoff Tanks for the Sanitary District and had just been awarded the Lock and Dam contract. After a little negotiation Ken found himself on the way to Davenport to a \$3,300,000 job consisting of 11 roller gates, 12 piers, and four miles of sewer, all to be completed by March, 1934. Ken is well satisfied with his new job, the duties of which are progress quantities, cost work, and any number of incidentals. On the domestic side of life, Ken has given up apartments and he and Mrs. Clark are strong for bungalows. Finally, he reminds me that June brings our Fifth Reunion. He says he would like to be in Boston at that time, but, of course, can't look quite that far ahead. We should like to hear from other fellows who hope to be in Boston in June. — GEORGE P. PALO, Secretary, 426 East 238th Street, New York, N. Y.

Course VI

Your Secretary a few months back decided that he would like to hear again from those of you who have become more or less lost to these columns through lack of contact with ye Secretary, and consequently embarked on a letter campaign to those of you whose addresses he has been able to obtain. The results so far have been gratifying and we hope before long to have heard from a good many more.

Bard Bardwell writes from Syracuse to say that he is with the Syracuse Lighting Company in charge of Supervisory and Automatic Control Equipment. Prior to 1929 and since graduation, Bard was with the New York Power and Light Corporation, working at Albany, Schenectady, and Hudson, first in the student training course and subsequently in the Department of Special Studies. In the fall of 1929, Bard was loaned to the Syracuse Lighting Company to assist in the conversion of the power system from 25 to 60 cycles, his special assignment being a study of road and voltage regulation. Upon the completion of this assignment he permanently connected with the Syracuse Lighting in the capacity stated above.

Bard tells me that Red Walsh is in the operating department of the New York Power and Light Company at Albany. The foregoing supersedes the data relative to Red's professional status given in the last Course VI notes and is gratefully

acknowledged. — Johnny Metcalf, who is district engineer at Buffalo for the Liberty Mutual Insurance Company and from whom we hope to have the pleasure of hearing shortly, is well and on the job continually, Bard reports.

At the N. Y. U.-Georgetown football game last fall, we ran into Dave Bradshaw, VI-A, who reports that he is with the Movietone Labs in New York City. As it was between the halves and time was limited, we had only a brief and rather hurried exchange of reminiscences. The rapid development of the talkies has been Dave's main diversion and apparently still is.

We started the New Year right by running into Cliff Terry totally unexpectedly on New Year's Day here in Flushing. Cliff, it seems, is beguiling his time temporarily with a company in College Point that makes paper cups, and is living at the Flushing "Y." We dropped in on him for a few minutes one evening recently and Cliff regaled us with his social and professional doings in his own inimitable way.

Mac McCarroll sent a very welcome Christmas card from Hollywood with a brief note that informed us that since graduation he has been employed as a sound technician for Paramount in the town of Kleigs. Mac gives very few details but we assume that his work keeps him right on the set and that he has many interesting stories to tell of this business of making movies. How about elaborating a little more in detail, Mac?

Vic Decorte and your Secretary recently enjoyed a very delightful dinner and evening at the home of Mr. and Mrs. John B. Russell at Jackson Heights, L. I. Johnny, as recently noted in these columns, is teaching in the Department of Electrical Engineering at Columbia. Vic, to our surprise, has resigned from commercial cables to matriculate at the Harvard Graduate School of Business Administration for the regular graduate business course. By going to school through the coming summer, with the exception of a few weeks vacation, Vic expects to finish in June, 1934, requiring about 16 months of intensive work to complete the course.

Ernie Knight, who was crew captain our senior year, dropped into the office the day before Thanksgiving. He came down from Springfield, where he is employed with Westinghouse, to attend the wedding of his sister. Ernie extends an invitation to all '28 men when they go through Springfield to drop in and see him.

E. W. Roessler is with the Engineering General Department of the General Electric Company at Schenectady, having completed in 1931 the three years of the advanced course in engineering conducted by the company. — E. J. Poitras is in the Switchboard Engineering Department of G. E. at Philadelphia, having completed one year of their advanced course in engineering. — E. W. Boehne is also with the Engineering General Department in Schenectady and has also completed

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three years of the engineering course. — PETER J. KIRWIN, *Secretary*, 42-16 Saull Street, Flushing, N. Y.

Course XIV

My guess is that XIV '28 men have been hit hard by the depression. Information concerning them has been extremely scarce for the past year and a half. I have received several letters from Harlan Paige keeping me informed as to his vocations. Harlan left the New Haven about a year ago and states that since then he "has been doing odd jobs around home and touring New England" — not a bad way to occupy one's time in our estimation.

Howard Emerson and Allan Gwathmey have left the du Pont Company. We have learned indirectly that Emerson entered the consul's school at Washington, but due to the scarcity of appointments he abandoned the idea of entering the consular service. — I met Jimmie Spear in Wilmington several times during the past summer. Jimmie has not had a job of a professional nature since graduation. He is at present operating a chicken farm down in Maryland about 40 miles from here (Wilmington) and I dare say is making more out of it than M. I. T. '28 electrochemical engineers are making from electrochemical engineering.

As for the other members of the Class, I have seen and heard nothing for over a year. I hope their jobs are keeping them so occupied that they don't have time to write. — As for myself, I am still with Krebs Pigment and Color Corporation. Under du Pont control, the company has expanded to include three plants located at Baltimore, Newark, and Newport (Del.) respectively, with main offices at Newark. In addition to the manufacture of lithopone, we now make dry colors and titanium pigments. The future looks very promising. — CHARLES E. BERRY, *Secretary*, 409 West 22nd Street, Wilmington, Del.

1929

It is with great sorrow that I write of the passing of John R. Buxton, X-A, on December 22 at Charleston, W. Va. The Class extends its deepest sympathy to his family.

Brig Allen crashed through with more information about the doings around Washington. I wish that all the Class felt the absence of class notes as Brig evidently did. Good work, Brig. Here is his letter: "It was certainly good to see a little 1929 news in *The Review* this last month. I missed it the first couple of issues and came very nearly writing before now several times but just didn't get around to it. I have seen few and heard from less of our class until J. J. Wilson called the other night. J. J. is working for the Waltham Watch Company and has been traveling all over this country and Canada trying to interest industries in a new Waltham product. Believe that he spends most of his time in textile plants. It was good to see him again and I am going to pass on the little news that he gave me.

"Ray Underwood is in town and we bumped into each other down town a while back. Spent the evening with him and his wife and had the pleasure of having a splendid home-cooked meal for a change. If Ray reads this, I hope he will give me a call again soon. He does not have a telephone and I can't get in touch with him. Ray is working hard trying to become a patent lawyer some day. No better place than Washington for it, I guess. Ray, as you know, is happily married, as so many of you are. It must take courage these days.

"Speaking of marriage brings to my mind a little bet made between Fish Hills, Charlie Denny, Ted Ewald and myself. I want to remind them of it and have them know that I intend to collect. — Chuck Worthen, I understand, is working for Canada Dry in Boston. Don't know what the job is, but probably putting bubbles in the water. — Dave Bremner is married and in Chicago. — Understand that Dick Piez is with Dewey and Almy on the West Coast and has a fine job. Good luck to him. J. J. said that he had seen Tony Zahka on his wanderings. I believe he said that he was in New Orleans.

"Am still here working on Government business and have been kept very busy. There has been a tremendous amount of building work as you probably know. We are interested primarily in motors for driving fans and pumps as well as compressors, and so on. Have landed our share, I believe, but don't like to brag about prices. Have had a good deal of Navy work also. The Navy work is very interesting. The applications are practically all special and give me a little opportunity to use some of my engineering education.

"I hope this finds you well and that you will give my regards to all you may run across."

Joel Whitney, II, loosened up and wrote a grand letter in, telling all about his doings since the last time he wrote me. He writes that he and his wife spent Christmas in Boston in 1931 when du Pont Cellophane temporarily ceased. That was Joel's first return since July, 1929, and it was his wife's first visit, for, if you all remember correctly, she is a native of Tennessee. They spent their time with Joel's family in Winchester and rubber-necking at points of historical interest. They saw Frank Stratton, V, too, but Joel didn't offer any further news about Frank. While north, they also made two visits to New York and after the shows and bus rides up Fifth Avenue, they arrived back in Nashville with about 15¢ left.

In May, a du Pont reorganization caused him to turn to selling insurance, although he vows he is only talking it, for business is dull. He is still interested in an engineering job, however, and continues to keep the dust off his slide rule and textbooks. On August 4 Joel became the proud daddy of a baby girl, Mary Alice by name, and she now weighs 16½ pounds. Congratulations from the Class,

Joel, and extend them to Mary Daniel for us. That was a sweet picture of the baby you enclosed.

Joel also says that Ralph Atkinson, IX-A, and his wife, Shirely, called on them on his way East. I guess Ralph went the rounds on that trip West and back, for as you probably remember, he stopped off in Akron with me.

Gratz Brown, II, called up the other night from Cleveland, where he was on business at the Winton Factory and Friday night we induced him to spend the night with us here in Akron. Saturday morning I took him out to view the construction of the *Macon*. We picked up Hank Gibbons, II, on the way and went with him inside the working area of the big airship. Hank is still working in the Goodyear Zeppelin Corporation and his explanations of the various features of the ship were valuable. Gratz left at noon for Detroit and if he made it in the time he set for the trip, he did some tall stepping.

Gratz is now working for the A. C. Spark Plug Company, a subsidiary of General Motors, and transferred from General Motors Research some time ago. He is co-inventor of the combination air-cleaner and silencer that most automobiles are now using and is doing quite a little traveling about the country adapting these pieces to the 1933 cars and to new uses.

He is not even engaged yet and seems to be another of those running Brig Allen a close race even though they have no bet. Gratz says he saw Fred Celler about a year ago in Toledo, but doesn't know where Fred is now. Fred was married and working for some company connected with airport promotions.

The following is an interesting and very welcome letter from Mace Smith, I. This is Mace's first contribution and sure makes up for lost time: "Suppose I am one of the many who have never helped you with the class news. I always read the letters in the back of *The Technology Review* and then wish for more news.

"Since we finished school I have seen but three of our Class, Ed Ware, Larry Hamlin, and Rudy Wisbrun. Ed and I have been separated most of the time. I haven't seen him since Christmas, 1930, when I was home (El Paso, Texas). He and Mary Crooks took the big step just two months ago. I know everyone will be happy to hear that they are married. Ed is working for the Graham Paper Company in Carthage, N. Y., and is doing fine. Their address is 204 North School Street.

"Larry Hamlin seems to be making real progress. He became the father of a girl August 19 last. Am quite interested in this couple because I was best man at their wedding in Chicago year before last. Larry left the Chicago Bridge Company some time ago to accept a position with the Standard Oil of New York. Their address now is 11 Franklin Place, Flushing, N. Y.

"Last August when I was home on my vacation I saw Rudy Wisbrun. He is working with his father in the mercantile business at Juarez, Mexico. He seems

1929 Continued

to be doing fine. His hobby is polo. He owns several good horses and plays with the El Paso Polo Team.

"As for myself, I have been leading a very uneventful life in Dixie lands. Have been in Birmingham for three years with C. B. and I. Company, wishing like everyone else that the depression would end.

"If you see or happen to write Brig Allen, please tell him that both Ed and I are still alive and bucking even if we aren't together. Do you have his address? — Best of luck for 1933."

J. S. St. Louis, VI-A, is now with the General Electric Vapor Lamp Company in Hoboken, N. J. — Charles F. Holdrege, VI, is with the Standard Oil Company of Nebraska and is located in Omaha, Neb. — Fred O. Urban, VI, is taking the third year of the advanced course in engineering conducted by the General Electric at Schenectady, N. Y., having completed the second in June, 1932.

D. W. Ver Planck, VI-A, is with the Engineering General Department of the General Electric Company at Schenectady. He completed the three-year advanced course in engineering conducted by the company in June. — Warren A. Spofford, II, is also with General Electric in the Work's Laboratory, and completed the advanced engineering course. On the back of his Christmas card he noted that he was in the G. E. Air Conditioning Department, Design Division, and says that there are still a few '29 men around there, including Sam Levine, Ed Gardner, and the above.

Harry Weare, I, is still in New England according to the address he added to his Christmas card, but he made that the only news. Sure was good to hear from you, Harry. Don't be so tight with the news next time. — Rudy Swan, VI, must still be with the Hygrade Lamp Company, for his Christmas card came from Danvers, Mass. How are tricks, Rudy?

In addition to the letter earlier in the month, Joel Whitney sent in a Christmas card from Nashville, thus establishing somewhat of a '29 correspondence record, having contributed twice in one month. — Ralph and Shirley Anderson must have gone to Boston, for their Christmas card was postmarked there. Ralph didn't offer any news, but I'll bet he could offer us a great deal based on that trip last summer.

One card contained only greetings and names, but disclosed some class news. It was the card of Joaquin Llansó, II, and was signed Joaquin and Dorothy. No doubt we are late in extending our best wishes, but better late than never. — Ed Farmer, VI, and his wife sent in their card from Saint Johnsbury, Vt., which is Ed's old home and makes me wonder whether he's vacationing there or no longer with G. E. in Pittsfield. — Sweezy Conklin, II, his wife, and daughter all were heard from at Christmas from Riverhead, L. I. Sweezy's a big business man in Riverhead by now, I'll bet.

Adam Stricker, X-B, addressed his card from New York, but didn't scribble any notes on the back of it, hence I can offer

no further information regarding his activities. Glad to hear from you, Adam, come again. — Larry Tufts, X, sent his card from Rochester and later a note which disclosed that he is Secretary of the Rochester M. I. T. Club. Congratulations, Larry. — Johnny Hartz, X, was reelected Secretary of our Akron M. I. T. Club. Congratulations to you also, Johnny. — Congratulations are also in order for Ed Perkins, VI-A, on his engagement to Ruth Felton Abbott of Danvers, announced in the Boston *Herald* of October 30.

I hope that all of you had a Merry Christmas and happy holidays and extend my best wishes for a prosperous and happy New Year. Write us all about yourself sometime when you get the urge for '29 class news. A few cards and letters like Brig Allen's and Mace Smith's go a long way toward making these columns interesting. Just drop a penny postcard with a line or two about yourself and those you have seen. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

1930

The news that has come to this office has been very scant and brief. However, what news we do have is good news, for we learn that a few of our classmates are still at work and among the fortunate employed.

We have word from Schenectady that S. J. Levine, E. R. Gardner, and V. C. Kaufman are still with G. E. Gardner and Levine are now in the third year of the advanced engineering course given by the General Electric Company, while Kaufman is now in the Patent Department.

We received two bits of news from Tom Wigglesworth — one from himself, one rather indirectly. Tom writes that his address has been changed to 649 W. Washington Boulevard, Chicago, Ill. He is still employed with the Wilson Mechanical Instrument Company as their Mid-West representative. We also hear that his engagement to Miss Francis Stevens Graham of Glencoe has been announced. So far as we know, no date has been set for the big event.

Any further news would be gladly received and promptly published. You send it in and we will edit and publish it. — MORELL MAREAN, *General Secretary*, 1239 Norwood Avenue, Niagara Falls, N. Y.

Course VI-A

A miniature reunion was held by this course when Prendy, Goodale, Bill Spahr, and myself attended an I. R. E. meeting recently at the Engineering Societies' building in New York City.

Steve Prendergast at present is trying out his cooking on anyone having a sufficient amount of faith or courage. Since I lack one or the other of these qualities, I haven't accepted his invitation to dinner at his apartment in Westfield, N. J. I maintain that that's why guinea pigs were born. Steve appears to be exhibiting radical tendencies lately, having recently admitted by telephone he is in favor of Technocracy.

THE TECHNOLOGY REVIEW

E. Dudley Goodale seems to keep busy making very small R. C. A. amplifiers which have very large gains. For social activity Goodale relies, as always, on his army dances. I assume that they are recurring functions. The only alternative is that they are continuous functions.

Bill Spahr is rapidly becoming an expert mathematician as the result of preparation for actuarial examinations in the Metropolitan Life Insurance Company. — If Levinton, in California, and Theriault, in Massachusetts, ever answer their mail, I will have some geographically diverse news to report.

Has anyone else noticed the striking resemblance of the young engineer who sometimes appears in the General Radio Company advertisements to our own Hermon H. Scott who is working for the General Radio Company? — EARL E. FERGUSON, *Secretary*, 60 Eaton Place, East Orange, N. J.

1931

Greetings gang! the midst of exams allows for the briefness of this month's notes. The big news of the month is that Hal Champlain favored the Institute with a visit, and if you don't think that is big news you don't know Champ (and who doesn't?). Champ was sitting as big as life, or bigger, in Professor Hamilton's office, when I strayed in there a few weeks ago. He promised to drop over to see me, but I had to leave before he reached the office — our corridors are narrow anyway.

The meteorology department reported an earthquake recently, but it was merely Bellows Kropf arriving in town. Bellows is with the Belding-Hemmingway Silk Company in Putnam, Conn.; he says that business is still a little in the dark but they're hoping to see the sun spread its ray-on things soon. Incidentally neither Champ nor Bellows aired their views on the possibility of getting beer back, which is strange, but maybe life is just a continual picnic for them. Speaking of earthquakes, Tim Rucker struck the Institute recently. Tim is a quaker, too; in fact, he's working in Philadelphia. Anyway, likes his work fine and is getting along o.k.

One of the seniors from the south, hailing a fellow classmate recently said, "I'll be a-seeing ya at the dance," whereupon several of our faithful brethren who still haunt the halls of the Institute thought he said, "I'll be a senior at the dance," which is the only explanation I can give of the number of '31 men at said dance. Don't ask me how I know how many were there. Most of them entered under disguise — I guess "de skies" the limit this year. One of our illustrious classmates used an imitation newspaper reporter's gold badge; no wonder he had a guilty feeling. It wasn't a bad idea, however, as he got in. No one could accuse him of Knapp-ing. One entered as a Gardner which, of course, is no disguise at all at a senior dance. Another came in while they were singing "Please." He convinced the door tender that they were paging him — his name

1931 Continued

being Pease — I'll admit the way they were singing the song that they would soon knock the 'I' out of it. DeStefano and Baratta were there, claiming that it is the only time Camp Technology has a reunion. The rest of the men were there as Technocrats; they had no reason for being there — or any where else, for that matter.

Johnny Smith has gone into the Ginger Ale business with the Chelmsford Company and is located in Worcester. Johnny was in a stationery business so he decided to get into one that was liquid. "Ales well that ends well."

Ben Steverman is selling life insurance, which should be interesting to those whose lives might be in danger. Ed Blake was married on January 14 to Miss Harriet Frances Maynard. The wedding took place in Newton Centre. Congratulations Ed and Mrs. Ed! I heard one of the boys remark recently that this was his "wetting" day but he was merely singing in the rain.

Bob Leadbetter has reached the heights already, that's what the Harvard Business School will do for you. He was seen among the "Gallery Gods" at the opera house of a recent matinee — and the most sceptic of you will admit that that's sure the heights. Is his face red! Is my face red! (I saw him). Are these notes read? (That's something to think about, though not an awful lot I'll admit.)

A letter from Johnny Hanley tells me that he had been working for an illuminating company but that the work has become so light that things don't look very bright — which is illuminating, even if discouraging. Since then John has been doing some extensive camping and hunting — hunting for wild game and a job. Knowing John, we are sure that by this time he'll be favorably situated.

Have received an announcement of the marriage of Emile Grenier to Miss Katharine Butler Johnstone. May we extend our congratulations.

A letter from Willis Fleisher which came in at the last moment is herewith given. Willis also seems to have struck a ray of sunshine, even if it is only a cosmic ray.

"See by The Review that you are taking care of the class news and I'd like to try to bring my record up to date. Not having been in touch since graduation leaves quite a gap to fill. — Spent last winter doing some research work on cosmic rays at the Bartol Research Foundation, the physical laboratory of the Franklin Institute.

"Visited Sam Bensinger in April and attended the meetings of the American Physical Society in Washington. A paper on cosmic rays of which I was co-author was read at the meeting.

"Since I was working for nothing, I went back on the street looking for work. Called on an employment agency in New York several times, and each time the fellow told me that Carl Harris had just been in. He hadn't been placed last I heard. Ran into Schaeffer, VI-A, on one of my calls at the Philadelphia Electric. He was just starting work there.

"A friend of mine started a local weekly paper in the northern section of the city and I ran it for ten weeks this summer. I was the business, editorial, and reportorial staff, and also wrote continuity for two radio broadcasts a week. Sort of a 'March of Time' proposition put on by the paper.

"Left that in October for the first real job I've had, doing research work for the Max Levy Company and the Repro Art Machinery Company, makers of screens and cameras for the halftone process. The work runs from the design of special castings for very large cameras to theoretical work on the construction of halftone screens. Working five days and just got a raise so things look a little brighter.

"What makes them look much brighter is the fact that my engagement has just been announced to Miss Mary Leffler, formerly of Savannah, Ga., now living in New York. She was at Wellesley while I was at M. I. T. No wedding plans just yet.

"Levee, a member of the class who didn't survive to the end, is married and living in New York. He's working for Lane Bryant, assistant merchandise man, or something like that. Leon Kolker, I hear, is with some oil company in New York, but I didn't hear which one. — And that's about all the news I know. Always look forward to seeing what's happening to the fellows."

If "speech is silver and silence is gold" the Course Secretaries must be still on a gold standard from all I hear from them. I suppose they can't take such things as a matter of course.

Till another month. — JOHN M. MACBRAYNE, JR., *General Secretary*, Room 1-181, M. I. T., Cambridge, Mass.

1932

Course III

A letter from Haynes gives a little more information about his and Bearce's experiences last summer placer mining in Idaho for gold. They did not come east until it got too cold. He does not say when that was, but I found it plagued cold there in the mountains in August. Their recoveries were sufficient to cover living expenses only, but they did a lot of prospecting, and have two claims and the water rights on a gulch, which they propose to take advantage of in the early spring. They lived out of doors until the weather demanded they take shelter so they built a cabin which Haynes says was quite comfortable if they put wood in the stove. They claim a great life even though not getting rich. Neither has a job but Bearce has been doing a little shingling and painting around his place and Haynes a little studying.

A note from Duffy states that he worked for a time in a small Bakelite factory in Attleboro, but he lost his job when the factory was forced to close down. He has no other prospects, but he has had at least more than some of us.

Jackman reports that he is still among the unemployed, but with a number of prospects, depending largely on the price of metals. He has gotten his name into

print because Professor Hayward used some of the pictures from his thesis in a paper. Boy, what a break!

Sam Lambert has had a varied career since June, 1932. He lists having had a small job in a refinery, a surveying job in the Coeur d'Alene district of Idaho, being assistant to a superintendent in an apartment house in New York, and at Christmas time doing some drafting work for Professor Morris at the Institute.

Now if we could just hear from the rest of you fellows, that would be great. Come on, don't be bashful. — HENRY J. CHAPIN, *Secretary*, 101 Ardmore Avenue, Ardmore, Pa.

Course X

Just before Christmas I ran into Bill Hall, Rolf Wallin, and a couple of other chemical engineers on their way to the Bangor practice school. They seemed well, happy, and not overworked. However, if I had a couple of other pals like Johnny Crowther (I've lost your address, Johnny) and Les Glichman, youse guys out there would get lots more news. Here's a good bit of Glichman's grand letter: "From my ramblings about the buildings of the Institute, I have picked up various bits of information about our classmates, some of which is just rumor, and some actual fact. Anyway, I'll give you what dope I have heard.

"Johnnie Brown tells me that Mike Castleman is employed as a research man for a company in Salem, Mass., Mike's home town. From Clarence Root comes the news that Fred Mahoney is employed by a concern in his home town of Biddeford, Maine. Quite a few of our fellow men have returned to the Institute to continue their studies, and not all have resumed their work in Course X. For example, Bellizia and Ammerman are enrolled in Course XV, and it is rumored that Ammerman refused a very lucrative position in favor of continuing his studies at Tech.

"John Brown, Dan Kentro, Jim Abbott, and Ed Poor are some of the boys who are studying for their master's degree in chemical engineering. I often see Bill Walsh and his pal Buckley shooting pool at Eddie Pung's, and I presume both are taking it easy, although Bill Walsh has lately been doing some research in rubber for the department.

"I see from the notes in the last issue of The Review that Chambers and Anderson are up to their old tricks in the School of Chemical Engineering practice, and it was no surprise to hear that Chambers screwed up the works at one time. This proves that both boys are in good health and are acting normally. — As for myself, I finished my courses at Tech last September, and am rambling around in search of work, aren't we all? Now and then I attend the classes at Tech which are offered for the benefit of unemployed engineers and architects, and am learning the fundamentals of accounting, as long as I haven't much else to do.

"Tonight I am going to one of those famous Beaver Key dances after the basketball game, and will miss that famous

1932 Continued

character of Bill Kirkpatrick with that crazy hat with the red key on it. Anyhow, I guess some of the other boys will be wearing them."

That seems to be about all I have on hand now so f'even's sake someone drop me a line and tell me about yourself. — WILLIAM A. KIRKPATRICK, *Secretary*, 35 Orchard Street, Portland, Maine.

Course XV

Gentlemen, all veneer aside, I bid thee one and all a most happy and prosperous New Year! A wee bit late, I appreciate, but change it, if you wish, to the nearest happy holiday when you read these notes. I was the humble recipient of one Christmas card this year, speaking of greetings, this one from no less than Bill Barker. Bill's card bore the words "Season's Greetings." Apropos of what? Bill always was a stickler for saying the right thing.

Bill sent a letter along a few weeks later, enclosing no dearth of tidbits of a newsy nature. Bill confesses that he spent two months at Akron, learning

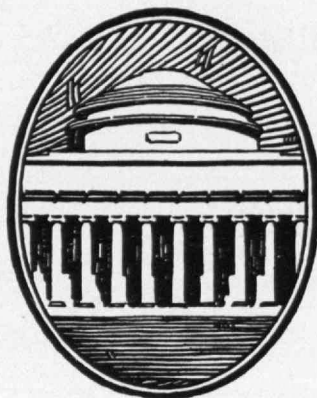
Firestone's sales methods, was then sent to the Bronx, New York City (I'm resisting the temptation to say something about the famed salute composed, 'tis whispered, within that locality) and is now in New Haven as Service Manager (Bill used the capitals) of a Firestone One-Stop Station there.

Had quite a letter from Charlie Isselhardt, too. Charlie is with Shell Petroleum, you know, now a service station salesman down in East St. Louis. He says the hours are lousy, as is the clientele (I expect he refers to his customers quantitatively, and not qualitatively), but that he is having a swell time and gaining experience no end. Vas you dere, Sharlie? (This Oshkoshian perverted sense of the humorous is getting a strong hold on me!)

Charlie has seen Bob Phemister, also with Shell, and has had telephonic connections with Eric Newman. Newman, reports Isselhardt, is studying law at Washington University, and working in a law office in his spare time. Hooray for dear old Dobbin!

Art Marshall has added his mite to this month's collection. He says that Joe Santoro is working with the Ginn Publishing Company in Cambridge. Tom Regan is doing "special work" for the American Oil Products Company of Somerville. Johnny Finnerty, as we have noted before, is with Gilbert and Barker as a supervisor in the sales department. Charlie Taylor "is assistant to a local (Boston) contractor." Ripley was a purser for the Nantasket Steamship Company this summer, plying between Boston and Nantasket Beach. This winter he is in the office. Art himself is still with the Malkin Motor Freight Company as an assistant manager.

Thus endeth the town cry for this moon. The letters are extremely helpful. I see that some of the other Secretaries have sent out cards. For Course V that would mean an expenditure of practically 75¢. Phew! I hope the letters keep pouring in. You can't send me letters collect! Cheerio! — ADDISON S. ELLIS, *Secretary*, 83 Washington Boulevard, Oshkosh, Wis.



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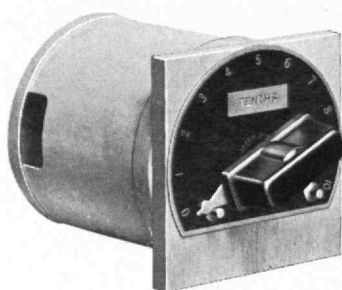
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